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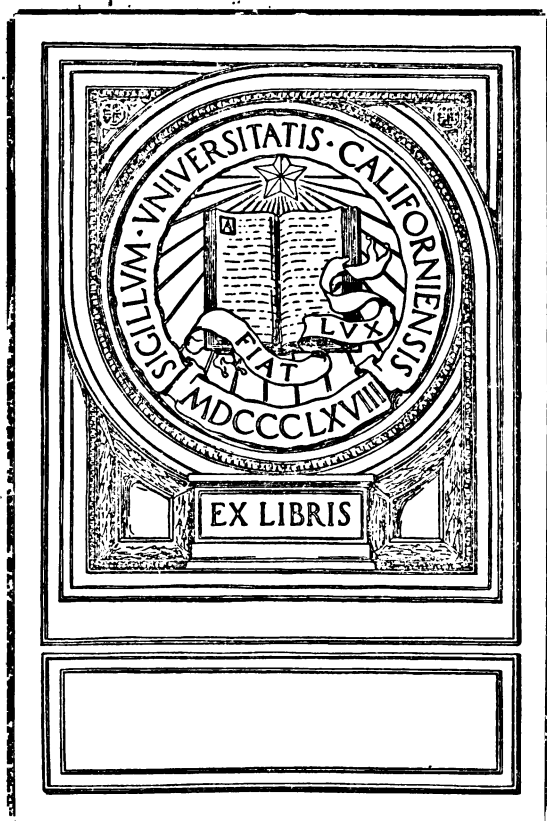
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INDUSTRIAL MEDICINE

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"The Practice of Medicine and the
Industries" presented at the XXXIXth
Annual Meeting of the American
Academy of Medicine, held at Atlan-
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TO VNU
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INTRODUCTION.

Following the custom of the last two or three years the American Academy of Medicine collates in this volume the papers and discussions of the principal topic of discussion at its last annual meeting. Notwithstanding these articles have appeared in the *Bulletin of the American Academy of Medicine*, experience has shown that there is demand for gathering the papers into a single volume for convenience of reference.

The opportunity offered by this publishing is embraced to thank all those who contributed to make the discussion so valuable. That it is but the partial presentation of the subject itself does not decrease its value because of the excellence of the papers upon individual topics.

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I.

THE CANCER DEATH RATE IN SELECTED OCCUPATIONS.

By **FREDERICK L. HOFFMAN**, LL.D., Statistician, Prudential Insurance Company,
Newark, N. J.

A full discussion of the occupational aspects of the cancer problem is out of the question on account of the paucity of data and the doubtful value of a considerable amount of available statistical information. Most of the cancer statistics by occupation fail to differentiate the organs and parts of the body affected, so that the initial seat of the disease cannot be correlated to the known factors or conditions producing irritability, or traumatism, resulting in cancerous growth. Authorities on the subject of workmen's compensation for industrial diseases are very guarded in their references to the interrelation of accidental injuries to cancerous growth, excepting such forms of malignant disease as will subsequently be discussed with the required brevity, but in sufficient detail to emphasize the points of most practical importance. From a statistical point of view the occupational aspects of the cancer problem are of exceptional interest and deserving of much more technical consideration than has been given to this phase of the cancer problem in the past. The evidence is apparently entirely conclusive that specific injuries to different parts of the body, whether internal or external, especially injuries resulting in a long-continued condition of slight irritability, may develop into cancerous growth of practically every known variety and degree of malignancy. That the relative mortality from cancer varies considerably according to occupation, has been established beyond a question of reasonable doubt by the decennial occupation mortality investigations of the Registrar-General of England and Wales. The classical illustrations of chimney-sweeps' cancer may be referred to as an extreme instance of an occupation peculiarly liable to malignant disease, so much so that by far the greatest excess of mortality in this occupation, according to the last report of the Registrar-General, "is at-

tributable to cancer, for which the comparative figure is $2\frac{1}{4}$ times the standard." In no other occupation does the disease apparently reach such excessive proportions, at least not in a fatal form. Chimney-sweeps' cancer is defined by W. J. Greer in his treatise on "Industrial Diseases and Accidents," as follows:

Epithelioma of the scrotum in chimney-sweeps is believed to be due to the long-continued irritation caused by the constant presence of soot on the part. The disease gives evidence of its maturity by the appearance of warty growths, which may remain quiescent or develop into ulcers. These ulcers progress and destroy the whole scrotum (purse). The glands in the groin become infected, and are eventually open, putrefying sores. The disease may ulcerate into the femoral or external iliac arteries and cause fatal hemorrhage. The disease is curable by early operative removal.

Chimney-sweeps' cancer in English experience has declined since 1890-'02 and at every divisional period of life. Regardless, however, of the fact that the mortality rate from cancer has diminished by nearly one-fourth, chimney-sweeps are still subject to the highest fatality from this disease, although, in the words of the Registrar-General, "In several other occupations, *e. g.*, inn-servants in London, brewers, furriers, laborers and seamen, the mortality does not fall far short of that of chimney-sweeps." Cancer among chimney-sweeps is not, however, as often assumed, limited to the typical form of so-called "sweeps' cancer," for, as shown by the English experience for 1900-'02, only 23 deaths were due to this form, out of a total of 71, or 32.39 per cent. In view of the fact that chimney-sweeping, by more or less identical methods, is a well-developed industry in Germany, the average number of workmen employed for the year 1912 being returned by the Insurance Association at 6,014, it may be suggested that the possible frequency of malignant growth among German chimney-sweeps should be ascertained for purposes of comparison.

Since the cancer death rate is largely a function of age, it is obviously of the utmost importance that in the calculation of cancer mortality rates by occupation, the age factor should always be taken into account. Some occupational groups have a very much larger proportion of persons of the cancer age than others, as best illustrated in the contrast of clergymen and bookkeepers, clerks and copyists, considered as a group. In the former the

proportion of population in 1900 at ages 45 and over was 45.5 per cent., against a proportion of only 14.1 per cent. for the latter. Crude death rates based upon groups so fundamentally at variance with each other, are obviously erroneous and often seriously misleading. In the English experience, for illustration, the crude cancer death rate for clergymen is 163.1 per 100,000 of population, whereas for school teachers the crude rate was only 52.5. When the required correction is made for age, the rates for the two groups are in close conformity, being respectively, for clergymen 87.3, and for school teachers 90.1. Equally striking is the result of a correction for age in the cancer death rate of English railway engine-drivers and stokers, which is increased from a crude death rate of 41.9 to 85.3. When the rates are corrected for age, the relative incidence of cancer in different occupations becomes a more trustworthy indication of specific liability, although a further correction for the organs and parts of the body affected would be necessary to establish the true causal relationship existing between specific employments and specific instances of malignant growth. According to the English experience for 1900-'02 (no later data having been published and no corresponding data being extant for the United States) for a few selected occupations with excessive rates, the rates are as follows: Chimney-sweeps, 224.9; seamen, 170.5; brewers, 166.6; tailors, 112.9; textile manufacturers, 112.6; fishermen, 111.9; lawyers, 111.8; inn-keepers, 108.8; gas-works service, 107.1; corn-millers, 105.3; shoe-makers, 103.2; butchers, 102.8; malsters, 101.6; metal-workers, 101.1; physicians, 101.1; hatters, 101.0; and glass-workers, 100.9. These occupations are not typical of any one pronounced condition of employment likely to be considered a predisposing cause of malignant disease. The wide variations in occupational conditions suggest that the causative factors responsible for cancer frequency are equally varied with regard to occupation as they are with regard to age, sex, race, etc. The most suggestive result of this analysis is the unusually high mortality from malignant disease in three specific, though widely different, employments, *i. e.*, chimney-sweeps, seamen and brewers. It is equally suggestive that relatively high cancer death rates

should also have been experienced in occupations quite similar thereto, *i. e.*, fishermen, malsters, and the gas-works service. The direct relation between occupation and malignant disease is largely obscured in the returns for industries instead of for specific occupations. This, however, is hardly the case for chimney-sweeps, seamen and brewers, since the employees in these groups follow more or less identical pursuits, or are more or less exposed to the same predisposing occupational conditions, be they what they may. If the group of men most exposed in the gas-works service could have been separated from the men not so exposed, there is a practical certainty that the rate for this occupation, with exposure more or less similar to that of chimney-sweeps, would have been materially increased. The same conclusion applies to fishermen, who represent a large group of employees with widely varying conditions of exposure, chiefly, of course, inland or shore fisheries, as different or distinct from fisheries on the high seas. If the latter group could have been separately considered, it is quite possible that the cancer death rate would have been materially increased and come nearer to the excessive rate found to prevail among seamen.

The wide variations in the relative distribution of the organs and parts of the body affected by cancerous growths in different occupations, are best brought out by the following table derived from the cancer census of the German Empire for 1902:

MORTALITY FROM CANCER IN THE GERMAN EMPIRE, 1902, ACCORDING TO OCCUPATIONAL GROUPS, AND ORGANS OR PARTS OF THE BODY AFFECTED.

	<i>Males.</i>			
	All occupa- tions.	Agricul- ture.	Metal workers.	Wood workers.
Bones.....	25	21	30	41
Skin.....	150	250	90	110
Respiratory organs.....	20	7	30	21
Digestive organs.....	703	642	750	685
Urinary organs.....	15	8	30	13
Glands.....	59	54	35	96
Breast.....	4	1	15	13
Generative organs.....	24	17	20	21
Total.....	1,000	1,000	1,000	1,000

Females.

	All occupa- tions.	Agricul- ture.	Textile workers.	Domestic service.
Bones.....	11	18	10	20
Skin.....	73	151	52	81
Respiratory organs.....	3	...	5	...
Digestive organs.....	306	338	235	323
Urinary organs.....	6	4	10	10
Glands.....	55	73	26	61
Breast.....	243	208	287	111
Generative organs.....	303	208	375	394
Total.....	1,000	1,000	1,000	1,000

The table is self-explanatory and requires no analysis, but attention may be directed to the excessive frequency of cancer of the skin among men and women employed in agriculture, as compared with other occupational groups. The cancer occupation mortality data, derived from the experience (1907-1912) of the Prudential Insurance Company of America, are limited to a statement of the male deaths in specified occupations from all causes and cancer by divisional periods of life. The highest proportionate mortality, at ages 35 and over, was experienced by coal dealers, or 12.3 per cent., followed by teachers with 11.3 per cent., gardeners with 8.5 per cent., engineers with 7.9 per cent., tailors with 7.5 per cent., brewers with 5.7 per cent., and lawyers with 5.0 per cent. These statistics, to a limited degree, confirm the English experience data, and also the occupational cancer statistics derived from other sources.

Statistical information must always be of secondary value to authentic instances of cancerous growth directly connected with occupational conditions. In the vast field of cancer research cases of this kind must aid substantially in the direction of disclosing the true nature of cancerous processes, particularly in so far as these are attributable to traumatism or long-continued irritation. Typical illustrations of cancers resulting from specific injuries more or less connected with the occupation are sufficiently numerous to preclude the possibility of mere coincidence in cause and effect. Quite a number of typical illustrations of traumatic

ulcers and cancers are to be found in Golebiewski's "Atlas and Epitome of Diseases Caused by Accidents," including cases of carcinoma of the kidneys, liver, peritoneum, stomach, spine and testicles. In detail the cases cited include one of floating kidney following contusion of the back and alleged laceration of the kidney; rupture of the kidney due to a fall from a scaffold; carcinoma of the stomach, the development of which was hastened by an accident with fatal termination; etc. An interesting case of cancer of the stomach following a single and short overexertion in connection with the pushing of a wheelbarrow, has recently been reported by Dr. Richard Schörfeld, of Schöenberg. (See *Medical Clinic*, Berlin, May 17, 1914.)

In these cases the relation of cancer occurrence to traumatism was apparently well-established. There are numerous other instances on record in which the occurrence of malignant growth is more indirectly but not less obviously the result of occupational conditions. Some of these have been summarized in an admirable manner by Sir Thomas Oliver, in his presidential address delivered in the Section on Industrial Hygiene at the Congress of the Royal Institute on Public Health at Paris, on May 16, 1913.

As early as 1910 a special report had been made on ulceration of the skin, epitheliomatous cancer, in the manufacture of patent fuel and grease, followed by a further report and draft regulations in 1911, and a final report by Alfred Herbert Lush, in 1913.¹ In the same year the results of a special study of the problem of gas-works and pitch industries in cancer was published by the John Howard McFadden Researches, in which the assertion occurs that cancer in the industries referred to was the result of chemical agents, known as augmentors, in the chronically injured site. It is further pointed out, in explanation of this important conclusion, that "there must be two factors before cancer can supervene: there must be present primarily in the injured site the auxetics which cause benign cell-proliferation plus augmentors

¹ The recommendations provided (1) for suitable bath accommodations; (2) for special protective clothing; (3) for the encasing of disintegrating machinery; and (4) for the use of wire goggles or some other equivalent protection for the eyes. Some of these recommendations, however, were subsequently withdrawn on account of strenuous objections on the part of employers and employees.

which cause malignant cell-proliferation when mixed with auxetics. Either factor by itself is harmless—it is the mixture which seems to be the causative agent.”

The practical importance of these studies is in connection with the administration of the Workmen's Compensation Act of 1906, which includes compensation for industrial diseases. In the scheduled diseases directly attributable to occupation conditions for which compensation is required to be paid are:

First, eczematous ulceration of the skin produced by dust or liquids, or ulceration of the mucous membrane of the nose or mouth produced by dust. Second, epitheliomatous cancer or ulceration of the skin, or of the corneal surface of the eye, due to pitch, tar, or tarry compounds. Third, serotal epithelioma (chimney-sweeps' cancer).

Epitheliomatous cancer, or ulceration of the skin, or of the corneal surface of the eye, due to pitch, tar, or tarry compounds, is defined by Greer in his treatise on “Industrial Diseases and Accidents,” as follows:

Continued irritation by tar and its congeners may produce an inflammation of the skin (erythema), and this, taken with the blocking of the ducts of the skin glands (tar acne), may cause the skin to become warty; when these warts break off an ulcer is often found underneath, this may heal up or it may assume a malignant character. These growths occur on the face, hands and scrotum of workers engaged in the handling of compounds of tar, such as making briquettes or unloading pitch, etc. These substances readily penetrate the working clothes, so that strict cleanliness is a useful but not an absolute preventive. The pitch may strike the eye and cause an ulcer, which may heal up leaving a scar which may obstruct the vision, or the ulcer may perforate the eye and destroy it. These epitheliomatous ulcers are dangerous, and the sooner they are removed by operation the better.

Sir Thomas Oliver has also discussed with admirable brevity the essential facts regarding malignant vesical growths in aniline workers, it being stated that vesical tumors with fatal results were thirty-three times more frequently observed among aniline dye workers than among the general male population. Sir Thomas arrives at the important conclusion that the cases observed are “an illustration of the occupation being a cause of malignant disease,” and he, therefore, urges the need of protective legislation for a class of workers engaged in an indispensable

occupation. The occurrence of malignant disease in the manufacture of synthetic dyes has been reported upon with exceptional thoroughness by Dr. S. G. Leuenberger of the Surgical Clinic of the Pathological-Anatomical Institute of Zurich, in 1912. The involved nature of the problem is best emphasized in the statement that Dr. Leuenberger's monograph has appended thereto a bibliography of over three hundred titles.

Illustrations of the specific occupational frequency of cancer, like the foregoing, are increasing as the result of specialized research and more careful observations on the part of the general practitioner. There is probably no more promising field in this respect than the chemical trade, as has been well brought out in the references to the subject by Rambousek in his treatise on "Industrial Poisoning," published in London, 1913. Regarding the occurrence of cancer in the petroleum industry, this writer points out that:

The occurrence of skin affections in the naphtha industry has been noted by several observers, especially among those employed on the unpurified mineral oils. Eruptions on the skin from pressing out the paraffin and papillemata (warty growths) in workers cleaning out the stills are referred to by many writers.

The most recent study of paraffin cancer, or of coal and petroleum products as causes of chronic irritation and cancer is by Dr. Benjamin Franklin Davis, of Rush Medical College, Chicago, reported in the issue of the *Journal of the American Medical Association* for May 30, 1914. The results of this investigation are summed up in the conclusion that: "It would seem safe to assume that the chronic-irritation cancer, produced by coal and petroleum products, is a chemical-irritation cancer, and that it is not impossible that the cancer following chronic irritation of other origin may be of an essentially similar nature."

In the nation-wide quest for cancer knowledge, there would seem to be few efforts more certain to lead to practical results than the strictly scientific study of the occupational incidence of malignant disease. The established variation in cancer frequency in different occupations suggests the possibility that the causes or conditions favorable to the development of

cancerous growth may be determined with greater accuracy on the basis of occupational observations than by any other method or means. A vast amount of information exists which has not been utilized in cancer research. The analysis of occupational mortality statistics, with special reference to cancer, is, of course, but a first step in the direction of strictly scientific research. The work of Green, of Edinburgh, established the apparently close relation between sulphurous acid, or sulpho-acid, and cancer frequency, and this is but one of the many indications of useful results following cancer inquiries along occupational lines. If there were no other evidence available, the thoroughly well-established occurrence of cancer following X-ray exposure warrants the suggestion that a much larger share of cancer research work should be devoted to the relative frequency of malignant disease in different occupations and industries. Just as on the one hand cancer is known to be exceptionally common in certain employments, so on the other hand cancer is relatively rare among workmen in certain other employments, among which mention may be made of tanners, and perhaps coal miners also. In the experience of the Bochum Miners' Union for 1912, out of 2,490 deaths, only 91, or 3.7 per cent, were attributed to malignant disease. The experience further shows that out of 242,645 admissions to the sick fund for all causes, only 39, or 0.02 per cent, were due to cancer. In the English experience the corrected cancer death rate of coal miners was 61.4 per 100,000 of population, compared with 265.5 for chimney-sweeps and 113.5 for seamen. It, however, has been shown by the investigations of Arnstein that malignant disease of the lungs prevailed to a remarkable extent among the miners of the Schneeberg district of Saxony. The minerals mined in this district are mostly cobalt, bismuth and nickel. According to Arnstein's investigations, one-third of all the miners admitted to the local hospitals during the period 1907-'11 entered with a diagnosis of cancer of the lung and this was given as the cause of death in 44 per cent. of the death certificates. The investigation does not appear to have been made with the required degree of careful attention to precise statistical analysis, but the actual cases reported in full, as given in the

original article in the *Vienna Clinical Weekly* for May 8, 1913, fully sustain the important conclusions of the author and suggest the urgency of further studies in this promising direction.

The established occurrence of cancer as an incidental result of the manufacture of patent fuel, or fuel briquettes, consisting of coal-dust and pitch in the usual proportion of nine to one suggests the importance of a careful study of this industry in this country, since the same, within recent years, has assumed considerable proportions. There were nineteen plants engaged in the manufacturing of fuel briquetting in 1912, using as a base anthracite culm, bituminous or semi-bituminous slack, carbon residue from gas manufacture, and peat. The binders used varied also and of the nineteen plants in commercial operation during 1912 coal-tar pitch was used as a binder by ten, one used asphaltic pitch, two used water-gas pitch, and four used mixed binders, the composition of which was not made public. There are few recorded cases of so-called pitch cancer in this country, but it is quite possible that increasing attention and more careful observation may prove that ulcerations of the skin, as well as true cancer, occur in this country, as well as in England and Wales, in connection with the manufacture of patent fuel, etc. It should be stated, however, in this connection that a case of multiple cancer of the skin in a tar-worker, who developed several scores of epithelial lesions in various stages of development upon the hands and forearms and a large epithelioma upon the scrotum, has been reported by Dr. J. Frank Schamberg, of Philadelphia. The case suggested to Dr. Schamberg the possibility of radioactivity in coal-tar and to test this assumption, according to the *Medical Record*, he "placed a copper cent, a flat key and a small brass numeral upon a photographic plate in a pasteboard negative box lined with black paper. Upon the under surface of the lid he attached a piece of cardboard smeared with coal-tar, so that the board faced downward. This box was placed in a black Japan tin cash box and the latter was shut in a dark closet for twenty-four hours. When the plate was developed a distinct shadowgraph of the three objects was seen on the negative." This test of coal-tar radioactivity is conceded by Dr. Schamberg

to be hardly conclusive, but he observes that "If coal-tar was proven to be radioactive, it would seem that this radioactivity might be responsible for the cancer in tar-workers." According to another account, Dr. Schamberg examined about twenty men whose work caused them to be smeared with tar. In the manufacture of tar-paper the men's arms are soiled with tar and their clothing is more or less saturated. Most of the men said that they suffered from time to time with outbreaks of "yellow-heads" on their arms, but these soon passed away. In a number of workmen he saw mild acneform eruptions on the arms resembling a folliculitis. Five workmen were found showing evidences of beginning or well-developed cancer.

The study of radioactive substances in their relation to cancer and occupation offers a field of considerable promise. The admirable experimental inquiry by Lazarus-Barlow suggests results of considerable practical value. With regard to substances commonly supposed to be causally related to carcinoma, this author states that:

Numerous samples of clay pipe, soot, pitch, paraffin wax, metallic arsenic, arsenious oxide, betel nut, cholesterin gallstones, pigment gallstones, renal and vesical calculi, have been examined skotographically, the calculi, renal, biliary, and vesical being made the subject of an extended research by Dr. Colwell. Skotographic effect was exhibited by one sample of soot out of two examined, by betel nut on all of numerous occasions, by each of twenty-three specimens of cholesterin gallstone, more or less "pure," in three out of four samples of pigment gallstones examined, the effect being always very slight as compared with the action of the cholesterin calculi, and by thirty out of thirty-eight vesical calculi. Metallic arsenic and arsenious oxide produced effects upon the photographic plates, but inasmuch as the films showed alteration before development the action cannot be regarded as skotographic. On the other hand, none of nine specimens of clay pipe, of numerous samples of paraffin wax, of four samples of pitch from different localities, of several specimens of coal, yielded the slightest trace of skotographic action.¹

Even though the evidence was rather negative, it would seem well worth while to carry on further experimental research along the lines suggested.

The relatively high frequency of cancer among seamen and fishermen would seem to support the theory advanced by Wilfred

¹ See *British Medical Journal*, June 19, 1909.

Watkins Pitchford, M.D., Government Pathologist of Natal, in an address on "Light Pigmentation and New Growth," in which the view is advanced that, "The increase of cancer within the last seventy-five years is, perhaps, due to the diminished protection from light and increased exposure to illumination. Woolen garments have been largely replaced by cotton, and black and brown clothes by those of a light color. Narrow streets and dark houses are no longer tolerated and suburban life has largely replaced tint of the city. Artificial light has become more actinic in its character." He further concludes, as a manifest deduction from the foregoing principles, that cancer may be prevented by efficient protection of the body from light and that natural protection, such as hair upon the face, should be encouraged. The clothing should be absolutely light-proof. The ventral surface of the throat and abdomen should be especially protected. Considering the almost universal non-protection of the upper portion of the chest of women at the present time, the conclusion of this author may be quoted as a word of warning, to the effect that, "Mammary cancer in women is usually due to insufficient protection of the breast from light." This ingenious author, it may be said by inference, also advances an explanation, at least in part, why the native or dark-skinned races, should apparently be so much less liable to malignant disease than the white races living in tropical or non-tropical countries. The very complex and involved theory which underlies the practical application of the principles of actinic therapy cannot be discussed in detail. The X-ray, radium, thorium, etc., are not only applied for purposes of treatment in cancer, but certainly in the case of X-rays, a distinct form of malignant dermatitis is of relatively common occurrence among workers exposed to X-ray emanation. An extended account of the surgical treatment of X-ray carcinoma by Dr. C. A. Porter, of the Harvard Medical School, published in the "Fifth Report of the Cancer Commission of Harvard University," includes eleven cases of undoubted X-ray cancers, of which six proved fatal. A remarkable fact disclosed by this investigation and not generally recognized as rather in contrast to general experience, was the fact that prolonged action

of the X-ray upon previously healthy skin resulted in malignant growth in persons who were, almost without exception, of an age which, broadly speaking, is not the cancer period of life. I quote from this very interesting and important discussion the following suggestive conclusion:

Though the harmful results of continuous exposure to the X-rays were unknown to the early workers in this field, it would seem that unwittingly they have given us the best demonstration yet known of the artificial or experimental production of cancer. It is unlikely that old age itself, with its accompanying skin atrophies, even if combined with exposure to such various noxious influences as sea life, raw winds, powerful actinic rays, soot or paraffin, would give such an example of malignant skin degeneration as seems so frequently to result from protracted exposure to the X-ray. When it is remembered that these lesions have been produced in young men at an age when skin cancer is extremely rare, its occurrence is all the more striking.

An ingenious explanation has been advanced by Green, of Edinburgh, in his discussion of the cancer problem, in which, after stating that X-rays admittedly caused a dermatitic and thereby diminished the resistance of the epithelium, he said that it must not be forgotten that most X-ray operators have also to prepare many skiagraphs and develop the negatives. This, in his opinion, is the direct cause of X-ray dermatitis, or in his own words, "fixing of plates by means of hyposulphite with fingers, the skin resistance of which is already weakened, is much more likely to cause the epithelioma than the rays themselves."

The foregoing discussion of an important phase of the cancer problem suggests the urgency of more extended occupational studies than have thus far been made. The cumulative evidence would tend to establish the truth or the falsity of prevailing opinion and, in any event, eliminate much needless and even misleading information. The fundamental principle of irritability as the direct cause of cancerous growth is apparently well sustained by occupational studies of the cancer problem. All disease, it is held by the foremost author on irritability, or the effect of stimuli on living substances, "consists of the influence of stimuli upon these physiologic processes." Every disease, according to this author, "represents only a disturbance of the physiologic pro-

cesses of cell life of the organism and the harmony in their combined workings." Believing that the available evidence regarding cancer warrants the conclusion that malignant disease is not the result of a single cause, I cannot do better than conclude by quoting the following most carefully considered remarks of Dr. Max Verworn, the author of the treatise on irritability:

Another point concerning the application of the conception of cause seems to me, however, to be of much more importance, namely, that a single cause is held responsible for the taking place of a process. One endeavors to explain a process in general by seeking for its "cause." The cause being found, the process is considered as fully accounted for. This idea is not one widely spread in every-day life, but is even found frequently in natural science, especially in biology, although here, it should be known, the processes are decidedly more complicated. The search for the "cause" of development, for the "cause" of heredity, for the "cause" of death, for the "cause" of the respiration, for the "cause" of the heart beat, for the "cause" of sleep, for the "cause" of disease, etc., was for a long time and frequently even today a characteristic of biologic investigation. As if such a complicated process as development, death or disease could be explained by a single factor: In reality, one has obtained very little as a result of the analysis of a process by discovering its cause; and in addition the false impression arises that through the finding of this one factor the process has been definitely explained. It has been generally recognized in the natural sciences in recent times that no process in the world is dependent upon one single factor and attempts have been made to give this fact more consideration.

The foregoing conclusions apply with special force to the cancer problem and provide the best possible answer at the present time to the constantly recurring question as to the primary cause of cancer and its direct relation to the larger problems of prevention, treatment and control.

II.

THE ECONOMIC IMPORTANCE OF LEAD POISONING.¹

By ALICE HAMILTON, M.A., M.D., Hull-House, Chicago.

Layet estimated that in France there are one hundred and twenty industrial processes which involve the use of lead or lead compounds. The Occupational Diseases Commission of Illinois found that lead poisoning had actually occurred in that state in connection with about seventy different occupations during three years' time, and the New York State Factory Investigating Commission has added several trades to the Illinois list. No poisonous substance finds nearly as great use in manufacturing processes as does lead and that is why the Germans call plumbism the occupational poisoning par excellence.

It is quite impossible to form even an estimate of the persons who are exposed to lead in our industries. In the trades studied by the Bureau of Labor there are a few where the number employed is fairly well known. The making of red lead employed in 1911 about 300 men east of the Pacific coast; the 20 principal smelters and refineries employ 7500, all of them, as of the red lead workers, exposed to lead. Much more numerous than any other class of lead workers are the painters but how many of them come in contact with lead no one knows, for in the census they are classed together with varnishers and glaziers and not all painters handle lead paint. Still they are numerically the most important of the lead workers.

The glazing of toilet ware and sanitary ware in Trenton and in the East Liverpool district requires the work of about 800 men and 150 women. In the art and utility potteries (majolica ware) of the Zanesville (Ohio) district and in the principal tile works in the country there are about 300 men and 250 women engaged in making, and applying lead glaze and in decorating with lead colors. The ten largest plants manufacturing porcelain enamelled

¹ This paper is based on investigations made for the Bureau of Labor Statistics of the following lead trades: smelting and refining lead; making white lead, red lead, storage batteries; glazing and decorating pottery and tiles; enamelling sanitary iron ware; painting. Bulletins 95, 104, 120, 140, 142.

bath tubs and sinks employ something over a thousand men in making and handling the enamel.

The making of white lead is one of the most dangerous of lead industries. In the 23 establishments east of the Pacific coast which were making white lead in 1911, there were 1600 men needed to keep up the monthly pay-roll. Another unusually dangerous lead industry is the making of storage batteries and the five largest plants in the United States employ, all told, something less than 950 men in the processes involving exposure to lead.

These figures added together would not give a total of the men and women who in the course of a year would run the risk of lead poisoning in these trades. As a matter of fact the number would be more than double that, for the only trades in this list which employ a steady force of workmen are the organized branch of the pottery industry and the organized branch of the painters. In all the others there is a stream of workers moving in and out all the time, so that in a smelter, or a refinery, or a white lead plant, or a storage battery plant, it may be necessary to hire in the course of a month from 20 to 50 per cent. of new men. In one refinery on the Atlantic coast less than 30 per cent. of the men had stayed as long as a year, in a white lead plant with a regular pay-roll of 58 there were 250 men on the books in six months' time, and a storage battery plant was found which had recently changed practically the whole of the pasting force so that where there had been exclusively Russian Jews there were only Slavs to be found.

When we consider that the industries mentioned are only a few of those using lead and that some of the others also are large and give employment to a changing, shifting mass of men, it becomes evident that in the course of a year a very great number of workmen are exposed to lead poisoning in our industries. In some of the lead trades poisoning usually takes place slowly and a man may work along for months or even years without experiencing trouble. Printers, painters who do exterior work, sign painters, and glaziers in the potteries, do not have acute plumbism unless they belong to the unusually susceptible. On the other hand the period of exposure to lead is short in the majority

of cases which develop in the white and the red lead industries, in enamelling bath tubs, in smelting, in making storage batteries and in glazing tiles. Thus in the first of these trades only 31 out of 120 men with lead poisoning had worked as long as a year before becoming sick, 8 had sickened in less than two weeks' time and 39 in less than a year. Thirty-four mixers of enamel averaged a little over 6 months' employment. The cases which developed among smelters had usually come on after less than four months' exposure and of 60 storage battery makers only two had worked a year and 50 less than six months. This shows that it is little protection to the men to have them shift often, indeed, the result is to bring in continually fresh victims, for among the new men will always be a proportion of the oversusceptible, and with such a shifting force it is impossible to eliminate them and settle down to tried and seasoned workmen. Legge finds a much larger proportion of plumbism among the casual workers in the white lead industry in England than among those steadily employed, the figures being 39 per cent. for the former and only 6 per cent. for the latter.

The actual number of cases of occupational lead poisoning in any trade is, under our American methods, impossible to discover. To be sure many of the states now have laws for the reporting and registration of all such cases, but these are too recent for us to know what success we shall attain by them. In Illinois the law applies only to physicians who are officially connected with lead industries. Our sick benefit associations have no records that are of any value except in a few minor instances. Therefore, the figures contained in the Government reports concerning occupational plumbism in certain trades are all merely approximate; it has never been possible to discover all the cases since the only available sources of information are the records of hospitals and of physicians and the statements of the men themselves.

Even with these drawbacks the rate of lead poisoning disclosed in the industries so far studied is very large. Among the 7500 men in our smelters and refineries no less than 1769 cases were discovered during 1912, a rate of 23 per hundred. The

makers of white and red lead, some 1600, had 388 cases in 16 months time, or a rate of 18 per cent. in a year. 930 storage battery makers had a rate of 17.4 per cent. during 1913. The 1100 pottery workers had 8 per cent. for the men and 14 per cent. for the women, rates which were almost exactly double those for the men and women in the British potteries. Enamellers of bath tubs and sinks suffer more than potters. In the 10 plants employing something less than 1100 men there were, in 1911, 217 cases of poisoning, a rate of 21 per cent., but an intensive study of 148 men brought to light a much larger proportion, for 54, or 36 per cent., of them showed signs of chronic plumbism.

The painters' trade is always the hardest of the lead trades to study and in our country with our lack of sickness insurance, it is impossible to find out how many painters suffer from plumbism. A local union sent out to its members, chiefly house painters, a questionnaire which was answered by 1009 men. 185 of them gave a history of plumbism, 72 of kidney trouble, 27 of chronic digestive disturbance and 77 of rheumatism. 100 house painters, not disabled by sickness, consented to submit to a thorough physical examination to determine the signs and symptoms of plumbism. It was carried out by Dr. E. R. Hayhurst, of the Occupational Disease Clinic, Rush Medical College, Chicago, who in addition to the physical examination, made estimations of the blood pressure, and examined blood and urine. To summarize his finding: symptoms of acute lead poisoning were not found in any case, but indications of chronic plumbism were found in at least 59 cases.

Just how much disability and economic loss this means, loss of wages during illness and of earning capacity after recovery, it is hard to say. Acute lead poisoning usually seems to mean a sojourn of five to fifteen days in a hospital, after which the patient is discharged "recovered." This recovery does not always mean that the man is well enough to go back to work. Even in mild cases it is often a month before he has recovered his full strength, and many cases are not mild. The British factory inspection service classifies all cases of lead poisoning as follows: Slight, including (1) colic without complications and of comparatively

short duration, (2) anemia in adolescence aggravated by employment, (3) either of the above with tendency to weakness of the extensors; moderate, (1) colic with anemia, (2) profound anemia, (3) partial paralysis, (4) constitutional debility; severe, (1) marked paralysis, (2) encephalopathic conditions, (3) grave undermining of the constitution associated with paralysis, renal disease, or arterio-sclerosis. If we adopt the same system for American cases we find in the potteries:

	Males. Per cent.	Females. Per cent.
Slight.....	48.3	60.8
Moderate.....	45.3	27.5
Severe.....	8.1	11.8

In the work of enamelling, the form of poisoning is likely to be more serious. Here the proportion of slight cases was only 40 per cent, of moderate, 48.1 per cent, and of severe, 11.9 per cent. There were 28 men with pronounced palsy and 8 with encephalopathy.

In one lead smelter there were, during 1912, 81 cases of which 56 were slight, 17 moderate and 8 severe. But it is among painters who remain long in their trade that one finds the largest proportion of serious plumbism. A study of 100 lead-poisoned painters showed that only 33 had had simple lead colic without complications, 42 had had palsy, 9 encephalopathic conditions, 11 eye disturbances and 11 arterio-sclerosis. The average of employment at the trade was 15.77 years.

The pasters in a storage battery factory usually suffer from rapidly developing and uncomplicated lead poisoning, yet if these men are followed up it will be seen that, simple and acute as the disease is, the effects are sometimes slow to clear up. For instance this is the record of twelve such cases who were looked up within a year of their illness.

Length of time employed.	Incapacitated.
8 months.....	3 weeks
3 months.....	3 weeks
6 months.....	4 weeks
5 months.....	5 weeks
2½ months.....	5 weeks

Length of time employed.	Incapacitated.
3 months.....	2 months
5 weeks.....	2 months
5 months.....	3 months
2 ¹ / ₂ months.....	3 months
6 weeks.....	3 months
6 months.....	4 months
6 months.....	4 months

This is only the general run of cases. Were one to pick out the unusual cases one could produce a tragic picture of early breakdown, of men in the prime of life with advanced arteriosclerosis, of skilled workmen forced, because of palsy, to become night watchmen or care takers of lavatories, of nervous breakdown, mental deterioration, insanity, even death. Every one of the trades thus far studied has yielded numbers of such cases.

Tuberculosis is the great foe of the working classes, but next to tuberculosis comes lead poisoning and according to our present knowledge the two go hand in hand, for lead favors the development of tuberculosis by lowering the resistance of the body to infection.

III.

HYGIENE AND MACHINERY HAZARDS.

By C. T. GRAHAM-ROGERS, M.D., Director, Division of Industrial Hygiene, Department of Labor of the State of New York, New York City.

"Safety first" has been the slogan in the industrial field. Safety organizations have been instituted and the profession of safety engineering has been established; strangely coincident with the enactment of drastic factory laws and workmen's compensation acts.

Safety engineering is concerned with the machinery hazards purely from the financial standpoint of the employer. We also have the insurance inspector, who is concerned with the hazard as a question of reduction of the company's liability. Finally, we have the factory inspector, who is concerned with the conservation of the health of the individual, the direct outcome of which has been the medical inspection of factories.

As a result of the medical inspection of factories in the State of New York, it has been proved that accident prevention where there is machinery hazard is a distinct branch of industrial hygiene, with the result that there has been created in connection with the New York State Labor Department a division of Industrial Hygiene, composed of engineers, chemists, physicians, working in harmony, so that the definite cause may be determined and specific preventive measures applied.

The cause of accidents on or about machinery, as well as the safeguard to be applied to prevent such accidents, should not be considered from a mechanical standpoint alone, as is the usual case. The human element, as well as the conditions under which the work is being performed, is of great importance, and as a rule entirely neglected. There should also be studied the ultimate effects upon the workers due to the attachment of preventive measures to the machine, for it avails but little if so-called "fool-proof" safety measures be applied, and yet the operator's health be impaired thereby.

Considering machinery hazard from a hygienic standpoint,

accident may be due to the questions of lighting, air conditioning, cleanliness, fatigue and personal hygiene.

Improper lighting is an inexcusable sanitary defect, and is a factor in the cause of many accidents. Poor lighting about machinery, especially stamping machinery, or where there are gearing, pulleys or belts, is the cause of accident through the inability of the person to distinguish objects clearly. Glaring light is also an important factor.

Air conditioning is of importance, for no worker can be employed in a high or low temperature, or relative humidity, not properly proportionate to the temperature, without lowering the vital resistance of the body. Where such workers are employed about machinery, they become less alert, and more liable to injury. It has been shown where accidents occur quite frequently that the number has been diminished after the installation of proper ventilation.

Where machines are subjected to corrosion through acids or fumes, there is considerable hazard, unless these fumes are efficiently removed through proper and sufficient means of ventilation.

Cleanliness is of importance; if rubbish is permitted to accumulate, it at times interferes with the proper working of machinery, and the operators are made to remove such rubbish while the machines are in motion, whereas constant cleanliness should practically reduce the hazard.

In certain industries, large quantities of dust are generated; this not only accumulates about the machine, but by being inhaled, causes pulmonary affections; also, by irritating the eyes of the operator increases the danger. For example, I might cite first, the case of circular saws; considerable dust is generated here, and unless properly removed, the operator is unable to see his work clearly, and, despite the fact that certain types of guards may be attached to the machine, the result is disastrous to himself. In this case an exhaust system is necessary in addition to the guard. Another case may be cited, that of guarding a shaper, which is a rapidly revolving spindle with sharp knives, and a machine to which it is at times difficult to apply a safeguard. In the course of operation, large quantities of shavings and dust

are created, and it becomes necessary for the operators to remove this accumulation; automatically, they move their hands to push away the shavings or try to blow them away. Very often, serious accidents occur through the fingers coming in contact with the sharp knives, a result of this almost uncontrollable rhythmic motion. Here, again, is the question of the removal of dust; this can be done only by the means of an air jet. A combination of improper lighting and impure air conditioning often results in accidents on looms and on automatic steel stamping machines. This condition was described by me some years ago, in a paper, and for which I used the term "mechanical hypnotism." In these cases, the worker is subjected to the glare of the light and to lowered vital resistance, due to vitiated air. Influenced by the constant monotonous din of the machinery, the worker becomes practically a part of the rhythm; something happens to break this rhythm, and before the operator can recover the natural poise, an accident has happened.

Personal hygiene is also an important factor in machine hazards, especially where women are employed. Constant friction of belts on pulleys generates electricity, and where women or girls are working close to such belting, the strands of the hair are attracted and become entangled in the lacing or pulley. Protection in this case is proper head covering. The absence of proper over-clothing, such as overalls for men, or aprons for females, is a factor, as torn clothing or loose sleeves might catch in exposed portions of machinery with fatal results.

The application of guards should not be considered merely a point of accident prevention. Very little is accomplished if the guard is placed about the machine to reduce the hazard, and the operator's sight is ultimately affected, or an occupational neurosis results.

For example: on stamping machines, where it is essential that there be proper safeguards to prevent the workers' hands and fingers being caught between the die and anvil, there is danger to the health of the operator, if the type of guard consisting of a rapidly moving wire mesh is used; for in this case where the loss of limb is prevented, the loss of eyesight is being encouraged.

Another example is on machinery where it is endeavored to place a guard requiring the movement of both hands in order to trip the machine; here again the loss of limb is prevented, but the loss of vital resistance is encouraged by requiring a constant monotonous movement. This is akin to the very speeding up, of which we hear so much, and which we are endeavoring to prevent.

These are but a few examples to illustrate that machinery hazards can be minimized by the observance of proper hygienic rules, and that the study of the cause must not be confined merely to the machine, nor should the preventive be determined from a mechanical standpoint alone.

An authority on liability insurance informed me that even in Germany, with its rigid reporting, he doubted whether half the accidents were tabulated, so it is very possible that many accidents due primarily to results of faulty hygiene are not reported, and possibly would have afforded valuable data to show the relationship of hygiene to the machinery hazard.

I would ask that greater attention be given to the questions of hygiene when studying the cause of accidents, and that the physician's advice be consulted before applying guards of indiscriminate type to machines requiring the constant attention of an operator.

The following figures may be of interest:

In New York State alone 44,309 accidents were reported in one year (1911) of which 376 caused death. 27.6 per cent occurred in working machinery, 4.4 per cent occurred in power transmission machinery. Of the deaths 7.7 per cent occurred in power transmission machinery, 5.1 per cent occurred in working machinery.

In the quarter ending September, 1913, 6,317 accidents were reported on mechanical power of which 354 were on saws, 126 on leather working machines, 99 ivory turning, 53 looms, 47 bottle washing, 40 laundry machines (burns), 24 carding (textile), 22 spinning (textile), 23 picking.

IV.

MEASURING THE COST OF CHILD LABOR.

I.

By ALEXANDER J. MCKELWAY, D.D., Secretary for Southern States, National Child Labor Committee, Washington, D. C.

II.

By OWEN R. LOVEJOY, LL.D., General Secretary, National Child Labor Committee, New York City.

I.

Mr. Chairman, I suppose you all recall the striking Scripture testimony to the ante-mortem inefficiency of the doctors as well as to the post-mortem efficacy of drugs, this testimony being found in the Sixteenth Chapter of Second Chronicles, as follows:

And Asa in the thirty and ninth year of his reign was diseased in his feet until his disease was exceeding great. Yet in his disease he sought not to the Lord but to the physicians; and Asa slept with his fathers; and they buried him and laid him in the bed which was filled with sweet odors and divers kinds of spices prepared by the apothecaries' art.

You would doubtless agree that in the year 914 B. C., it would have been better for any one, king or peasant, to seek the Lord rather than the physicians. In the days of Christ, we learn of the woman who had "suffered many things of many physicians and was nothing bettered but rather grew worse." I suppose that even coming down to the year of our Lord, 1784, you would not regard the opinion of the physicians of Manchester, England, as of very great value on individual diagnosis or prognosis. They had investigated a fever epidemic at the Radcliffe cotton works, and while they professed ignorance of its cause, they said:

But though this point remains doubtful, we are decided in our opinion that the disorder has been supported, diffused and aggravated by the ready communication of contagion and by the injury done to young persons through confinement and too long-continued labor, to which several evils the cotton mills have given occasion. We earnestly recommend a longer recess at noon and a more early dismissal from it in the evening, to all those who work in the cotton mills; but we deem this indulgence essential to the present health and future capacity for labor for those who are under the age of fourteen; for the active recreations of childhood and youth are necessary

to the growth and right conformation of the human body. And we cannot excuse ourselves on the present occasion from suggesting this further very important consideration, that the rising generation should not be debarred from all opportunities of instruction at the only season in life at which they can be properly improved.

These same Manchester physicians, then constituted into a Board of Health, in 1796, passed the following resolutions, among others:

The large factories are generally injurious to the constitution of those employed in them, from the close confinement which is enjoined, from the debilitating effects of hot or impure air, and from the want of the active exercises which nature points out as essential in childhood and youth to invigorate the system, and to fit our species for the employments and for the duties of manhood. The untimely labor of the night and the protracted labor of the day, with respect to children, not only tend to diminish future expectations as to the general sum of life and industry, by impairing the strength and destroying the vital stamina of the rising generation, but it too often gives encouragement to idleness, extravagance and profligacy in the parents, who, contrary to the order of nature, subsist by the oppression of their offspring.

From the excellent regulations that subsist in several cotton factories, it appears that many of these evils may be in considerable degree obviated; we are therefore warranted by experience, and are assured we shall have the support of the liberal proprietors of these factories, in proposing an application for parliamentary aid to establish a general system of laws for the wise, humane and equal government of all such works.

Regarding the old saw that prevention is better than cure it seems to me that the doctrine laid down by the Manchester physicians is of considerable value. We who have been fighting for ten years in the cause of child labor reform have enlisted to a large degree the support of the other two learned professions. The pulpit of America speaks its mind freely on the evils of the child labor system, and several thousand pulpits unite in the condemnation of the system on what has come to be known as Child Labor Sunday. The members of the bar, through the American Bar Association and its Commission on Uniform State Laws, unanimously endorsed what is known as the Uniform Child Labor Law, containing the best standards of existing statutes already in force in the United States, and recommended this law for adoption by all the states. The same standards of pro-

tection for children are included in the Federal Child Labor Law.

And now we come to the other learned profession and ask them to assist us in "Measuring the Cost of Child Labor," which is the title of the paper written by the General Secretary of the National Child Labor Committee, which, in his necessary and regretted absence, I have been asked to read to you.

II.

To measure the full cost of child labor is impossible. There are too many elements in it which are spiritual, invisible to the eye, and yet all the more serious in their effect upon us. As a race, we are hardened—debased—by accepting the habit of jobs a-plenty for children and jobs too scarce for adults. We tolerate an order in the industrial world which contradicts our high instincts for the care of the weak and the undeveloped, and our social inconsistency is as dangerous to the sound development of the social organism as moral inconsistency is dangerous to the individual.

The National Child Labor Committee believes that child labor is one important cause of low wages and unemployment among adults and our belief is confirmed by the fact that wherever children have been eliminated from an industry the wages and standard of living have risen. In so far as our assumption is correct, child labor leads to under-nourishment and over-crowding and an increased susceptibility to disease among all the workers involved. Like the spiritual costs, these indirect physical effects work an injury to society which is evident enough to the impartial observer but quite impossible to measure.

To the children themselves there are costs in ignorance and inefficiency, again obvious but difficult to reckon. Of these I shall not attempt to speak but shall confine my remarks to the measuring of physical costs to the children. The physical costs of child labor to the children have always made the most popular appeal against child labor and I believe it has been the general realization that no child under 14 could work in a factory without serious physical harm, which has led people to support the improved child labor laws that have been passed since this Committee was organized ten years ago. These costs are so obvious

that to spend months or years in measuring the effects of child labor by young children in canneries, cotton mills, factories, and stores, instead of taking the children out of industry without delay would be little short of criminal. That these costs are well understood and acknowledged even in those states which do not have a 14-year limit in factories, mills, and canneries, is evident by the arguments employers are offering nowadays in opposition to improved child labor laws. They have been shamed out of referring to the benefit to their industry; they acknowledge that for the children themselves the work is not the best possible childhood, but they set forth an array of specious defenses, greater evils beside which the lesser evil of child labor may appear necessary or even tolerable.

But with young children in outdoor work and with older children in all occupations, we enter upon debatable ground, where the need for a careful study of physical costs is urgent. We believe that our present standards of child labor legislation—a 14-year limit in factories and a dozen other common occupations, a lower limit for newsboys and other street workers, and no limit whatever for children in the fields—are utterly inadequate, and do not protect the children from physical harm, but we know that our opinion and perhaps even *your* opinion will hardly convince the public against the tradition of generations, until the relation of physical costs to such child labor is established.

For instance, the newsboy is subject to a constant nervous strain in the tension and excitement of the streets. His hours and meals are irregular and unwholesome. If he combines his work with attendance at school he is continually overdoing. Everything about his life conspires to develop a taste for stimulants. There are moral dangers in his work, but we believe that on physical grounds alone street work by children under 14—or better, under 16—should be forbidden.

We find little berry-pickers and cotton-pickers whose work seems to involve all the worst phases of factory life except the lack of fresh air; simple monotonous processes repeated hour after hour, day after day, exhausting one set of muscles while others are unused; and in many cases the carrying of heavy trays

or boxes of fruit and bags of cotton which must strain and injure little bodies. Are we right in believing that these and certain other forms of agricultural work are physically harmful and that even a strict enforcement of school attendance laws would not protect these children? Until we can prohibit entirely the employment of very young children in all occupations, and all children under 14 in the most injurious forms of agricultural work, we should at least supplement our school attendance laws with special permits issued only to those children who come up to the standard in physical health and in grade work.

You will agree, I am sure, that a 14-year age limit is a perfectly illogical and inadequate restriction of the age of children entering industrial life. About half of the states have recognized that 14 is a compromise limit by excluding children of fourteen from certain specified occupations classified as physically or morally dangerous. But with the exception of Ohio, which has fixed a 15-year limit for boys and a 16-year limit for girls in factories and other common forms of employment, and Montana with her 16-year limit for all employed in factories and as messengers, the kinds of work forbidden to children under 16 or 18 years have been selected from the occupations and the types of machinery recognized as hazardous for adults. The physical costs on which they are based are costs in accidents or in severe occupational disease. But we maintain that among the kinds of work permitted in practically all states to children of fourteen there are many that are not only dreary and monotonous to adults but positively harmful to children.

To measure the costs of these three forms of child labor—street work and agricultural work by children under 14 and industrial work by children over 14—it seems to me that a study of the problem should be made simultaneously from three angles. We must determine the child's physical condition before he goes to work, his physical condition while at work, and we must know the history, family and industrial, of minors who come under medical care.

In a few child labor laws, the machinery is already provided by the state for a study of the first point, the physical condition of

the child before he goes to work. Twenty states require or permit a physical examination of every child who applies for a work permit, although only a few of these interpret this provision to mean a complete examination of all children regardless of their general appearance. Eleven states, including seven of these twenty, issue a permit only for a definite, actual job, and require the child to return for a new permit when he goes to a new employer. Under such a law, passed in 1912, the Maryland Bureau of Statistics and Information which issues the permits for Baltimore City, examined in one year 1500 boys previously employed in factories, and found 93 serious occupational defects. This month the medical examiner wrote me that he had especially examined for height, weight and pubic age, one hundred boys who averaged fifteen years of age and had been employed in factories for an average of two years each. It should be noted that Maryland has a fairly comprehensive list of dangerous occupations forbidden under 16 years, so that these boys were doing work not recognized as injurious. He found their average height nearly one-half an inch lower than the standard for fifteen years, which he reckoned as 5 feet and 1 inch; their weight was 92 and 52/100 lbs. as against a normal average of 106³/₄ lbs.; and only 58 per cent. were of pubic age.

In Ohio, by the coöperation of the school authorities, public-spirited citizens, the Schmidlapp Bureau, and the National Child Labor Committee, Mrs. Helen T. Woolley and her assistants are now making an extensive study of 800 children, selected from those who went to work at 14 years in 1911-12, and of a companion group of children of corresponding age who remained in school. Tests are applied covering all the details of development and education and the results will be most valuable for the occupations other than street work of city children.

These provisions for physical examination in connection with a work permit issued for a definite job, when thoroughly carried out, should insure a normal development of the child before he enters industry. And by excluding children who are anemic and diseased this preliminary examination not only gives the sub-normal child a better chance to improve physically, but it clears

the ground for a fair study of the actual effects of industry upon healthy children. Until the sub-normal children are eliminated, we cannot assert that the physical deterioration of children at work is due to the work and not development of the child's condition before he went to work, nor can we demand for all children, physically strong as well as physically sub-normal, a higher age limit for industrial work.

A large percentage of the children in cities or towns with several industries drift about from one job to another. In so far as some children drift from one factory to another factory, and others change from store to store, or from errand boy here to errand boy there, such records as those in Maryland and in any other state which applied thoroughly these two provisions of a child labor law would furnish a basis for comparison concerning the healthfulness of factories, and stores, and miscellaneous jobs, but they do not cover effects of their work upon the children who stick to one job, and they do not supply material concerning special industries until they are supplemented by thorough medical inspection of the children actually at work. Two states, Massachusetts and New York, have made a beginning of medical inspection of children in factories.

In Massachusetts, each industrial health inspector is required to inform himself concerning the health of all minors employed in factories within his district, and whenever he may deem it advisable or necessary, he shall call the ill-health or physical unfitness of any minor to the attention of his or her parents or employers and shall report it at the State Board of Labor and Industries. Since the law was passed in 1907, several thousand children have been "seen and questioned," but the number of actual examinations has been of necessity small, covering only those whose appearance of ill-health or whose family history has aroused the suspicions of the inspectors. Hardly more would have been possible with the staff provided to make this inspection in addition to other duties. It has failed to protect all the children suffering from serious defects, since the inspectors have had no power to revoke employment certificates and it has not furnished a basis for deductions concerning the less evident forms of physical injury involved in factory work.

New York has appointed three physicians to "inspect factories, mercantile establishments and other places throughout the state with respect to conditions of work affecting the health of persons employed therein and have charge of the physical examination and medical supervision of all children employed therein." The inspectors report cases to the Commissioner of Labor, who has power to revoke a certificate when he sees fit, so that the New York law affords a little better protection to the children themselves, but the staff is too small and their duties too numerous to furnish reliable data for generalizations concerning children in factories.

There has been one interesting study of the industrial history of minors who come under medical care. In 1911, the Massachusetts General Hospital recorded a complete set of facts concerning every unmarried working girl who applied for medical relief at the charitable clinic during eight months. It was found that the great majority of them had left school at fourteen; three at the age of ten. Seven girls went to work at twelve. The number studied (only 80 in all) was too small to draw conclusions concerning effects of age and occupation, but a similar study of both sexes in several localities and covering a longer period of time would give convincing evidence.

There are several ways in which you can help us, if you will, to measure the cost of child labor. These rudimentary beginnings suggest the line for further activity in which state agencies and private medical organizations might well co-operate, and with a minimum of effort arrive at valuable results.

As citizens, and as members of the state medical associations, we would ask you to second our efforts to incorporate in the child labor laws the provisions concerning physical examinations and work permits to which I have referred. Your active participation in such campaigns would show the public the importance of these apparently uninteresting phases of child labor legislation. And such provisions being on the statute books, you doctors can in your own localities do more than any one else to see that they are carefully and consistently applied.

You can help, again more than any laymen, to secure the medical inspection of children at work. I believe the state medical

inspectors in New York and Massachusetts would welcome your co-operation in a detailed study of all the children at work in special localities or of all the children at work in certain industries. The federal government has published a volume on the causes of death among cotton mill operatives which show such a startling tendency to tuberculosis and other pulmonary diseases that we should be justified without further study in classifying work in a cotton mill as a dangerous trade. Similar studies, covering all *minor* operatives in other child-employing occupations, could be made by the co-operation of private physicians in different places, under the guidance of a well-drawn schedule.

And in the third place, you can follow in your clinics the example of the Massachusetts General Hospital. In some industrial communities the industrial history of those who come for treatment would yield information of the highest value to your profession as well as to the general public.

The public may reasonably ask why the National Child Labor Committee does not undertake these technical studies on its own account. But obviously no such question could arise among those interested in this gathering because you realize, as the layman cannot, the technical difficulties of securing and communicating to the public any kind of information dealing with matters of public health. To have such work carried on by a propagandist organization like ours, an organization which in ten years has achieved a certain prominence as the aggressive promoter of child labor legislation, would tend to prejudice the results. Furthermore, the very need of our activities precludes a patient devotion, at the present time, to the kind of scientific investigation referred to. So much remains to be accomplished along lines that are obvious to every person of average intelligence that we have considered our duty to lie in the direction of securing the enactment and enforcement of laws approved by popular intelligence but opposed by an equally popular self-interest rather than in lines of scientific research. We believe the time has now come to lay upon the conscience of the medical profession in America the duty of duplicating in our own country the scientific study upon the physical effects in industry, already available in European industrial communities.

V.

CAUSES OF MORBIDITY AND MORTALITY IN THE INDUSTRIAL PARTURIENT WOMAN AND MEASURES FOR IMPROVEMENT.

By E. E. MONTGOMERY, M.D., LL.D., Philadelphia.

It is difficult to predict what the future evolution of woman will effect in her association with the home, but with society as at present constituted her position in its relation to her husband, and her influence on the future welfare of her progeny is of the utmost importance. She makes or mars the home-life; indeed, in a supreme degree she is the home. A home made attractive by a wife's loving care and thought saves many a man from temptations and dissipations which constantly dog his footsteps. Children recognize the home as a haven from every danger where they are trained to meet bravely and to overcome the trials and obstacles of life; a mother's counsel gives them courage to meet the difficulties which are inevitable, and the inspiration to fight life's battles with renewed energy. However hard her position when unfitted by lack of proper education and training for the superintendence and management of a home, she is still further handicapped by limited means, frequent child-bearing and the responsibilities associated with the training of children, when all her energies are apparently needed to supply her children with food. It is sad to contemplate how little consideration is given to the education of the ordinary girl for her actual work in life. A training in domestic science is rarely thought of for a woman unless she expects to teach, yet the economic selection and preparation of food, the recognition of the proper texture for clothing and its preparation are of vital importance to home-making and spell success or failure for the young couple who so blithely start on life's journey. Even when well equipped for the trial the result is rendered doubtful by every condition which lowers the vitality of such a worker, and renders her unable easily to maintain her proper equilibrium so that what would be a pleasurable work of love becomes a task too irksome for her diminishing

strength and produces a nervous, irritable croaker whose presence it is a relief to escape.

The primary object of mating is the propagation of the Race, and the rightly constituted sensible woman regards this as her highest function. Next to marriage probably no function has a greater influence upon her health, and consequently her future well-being. It is true that parturition is a natural procedure, but through the process of evolution woman has departed a long way from the animal in her method of delivery, and in its influence on her future welfare. A number of factors enter into the promotion of a successful and easy labor. The woman must be in good health mentally and physically. During the period of gestation her economy has had to provide for the nutrition and elimination of herself and the offspring developing within her. If her financial environment is such that she is unable to provide herself with sufficient or proper food, if she suffers from neglect or has the realization that she has lost or never had the love of her life companion, if she is constipated or suffers from defective renal elimination or other disturbances of secretion, toxemias are likely to be produced which may imperil promise of future good health or may endanger life. Eclampsia, which is a consequent of toxemia, may cause the death of mother, offspring, or both, or it may produce destructive changes in the nervous or renal structure of the mother or child which are consequently irreparable.

The most frequent causes of disturbance in the parturient, which are also capable of prolonged evil effect, are the injuries which occur to the birth canal, most frequently seen in the form of lacerations of the cervix, vagina and pelvic floor. By such injuries, or even without them, opportunity is afforded for the entrance of infection. Probably the woman living in rural surroundings, whose life is spent largely in the open, is less likely to be the subject of infection. A life of activity is not detrimental to the woman approaching parturition, but there is a great difference between the activity conducted within doors—in the crowded city, possibly in crowded sweat-shops, ill-ventilated factories—and the life of the open country. The conditions experienced

by the city women combined with insufficient or improper nourishment, the loss of rest and worry incident to financial problems increase the danger of infection through lessened resistance. Life in overcrowded, ill-ventilated and undrained tenements, frequently an entire family and even two or more families occupying one apartment, with no provision for bodily cleanliness, with insufficient or no bed linen, present conditions most unfavorable for procuring any degree of asepsis, no matter how efficient the attendant, but when this state is combined with the attendance of incompetent and inefficient midwives, or what is still worse, by physicians who have grown careless and who do not feel that the expected remuneration is commensurate with the trouble required to provide proper safeguards, is it surprising that such patients are subsequently handicapped by the consequences of infection? Injuries go untreated and the patient is obliged to endure the consequences, or leave her child to the care of others while she sojourns in a hospital for the repair of conditions which should have received attention during her puerperium.

When I began the practice of my profession the lying-in hospitals were considered less favorable for the parturient woman than her home because of the danger of conveying infection from one patient to another, from the want of suitable provision for the cleanliness of the confinement room and the failure to observe proper precautions by her attendants. In the Philadelphia Hospital, nearly forty years ago, as was the rule, I went directly from my service in the surgical wards, where there were cases of erysipelas and other forms of infection, to the obstetric department, and, naturally, my advent was followed by an epidemic of puerperal fever, as it was then called. Such experiences were of annual occurrence and it was only when we awoke to a realization of the necessity of treating obstetric patients with as much consideration as our surgical cases that the occurrence of puerperal fever, or sepsis, was recognized as an avoidable disease. Its existence became a reproach; an indication of neglect of proper precautions which no medical attendant could afford to ignore, hence the hospitals for such patients have been made safe, and now afford greater immunity against

the development of infection and its sequelae. Unfortunately, the demands of the home-life, the presence of other children for whom suitable provision is difficult to be secured, and other circumstances in the life of the industrial woman often render her unable to accept of the better provisions of the obstetric hospital.

The production of healthy men and women is so dependent upon the mother's health that the pregnant woman should have opportunity afforded her to prepare for the ordeal of parturition, and when her environment is unfitted to ensure her from disease during that period the State should provide for her and for the necessities of her children when they cannot be otherwise properly cared for. Naturally to make such provision means the expenditure of large sums of money as well as interference with the family life of the individual, but this paternalism has its compensation in the conservation of the health of mother and offspring and the State is saved the care of a race of weaklings who are mentally and physically unfitted to successfully make the struggle of life.

VI.

FATIGUE AS AN ELEMENT OF MENACE TO HEALTH IN THE INDUSTRIES.

By L. DUNCAN BULKLEY, A.M., M.D., Physician to the New York Skin and Cancer Hospital, Consulting Physician to the New York Hospital, etc., New York City.

Fatigue may be healthy or unhealthy. After a hard day's labor or sport in the open air there is a certain sense of fatigue, a desire to rest muscles which have been put to active service, which is both normal, and may even be pleasant. The result of this is increased and improved metabolism, attended with a greater appetite and good digestion of proper food; the various organs of the body then act readily to replace the lost vitality, and the ultimate result is a betterment in the general feelings, and under ordinary circumstances an improvement in health. The same is more or less true in regard to mental fatigue. The proper use of the mind is school or college, or in literary pursuits, may produce a fatigue which is normal and which is readily recovered from with proper rest and sleep, and results in strengthening the mental faculties.

But it is far otherwise when either in work or recreation the physical or mental fatigue is pushed beyond a certain limit, and when proper measures of recuperation are not employed; and this is what constantly occurs in connection with many of the occupations involving physical or mental strain, as in the case of operations in various factories, school-teachers, secretaries, and others, and which should be guarded against, both for the individual's well-being and for the efficiency of the work.

I. NATURE OF PHYSICAL AND MENTAL FATIGUE.

What we call fatigue is a nervous sensation akin to hunger, thirst, dyspnoea, drowsiness, etc., indicating that the tissues have undergone a wasting process from activity, physical or mental; for we must remember that there is a brisk interchange of substances going on constantly in all parts of the body, cellular elements being continually destroyed and new ones formed to take

the place of those which have done active service. While no one has actually seen this destruction and re-formation of tissue cells, the terms catabolism and anabolism are familiar to all, as indicating the chemico-physiologic processes by means of which these activities take place through the agency of the blood stream, largely in the muscles.

All muscular movement is attended with the consumption of material thus supplied, and with the production of certain waste products which have to be removed; principal among these is carbon dioxide, resulting from the combustion of sugar, starch, and fat, through the agency of oxygen, also supplied by the blood. The failure to have a full and proper supply of these nutritive articles by the blood, and of oxygen, through the lungs, results in an excessive exhaustion of muscle cells and a sense of fatigue sooner and easier than should occur under perfectly normal conditions; thus, fatigue is often a relative matter, depending more upon the nutrition and vitality of the individual than it does upon the actual muscular exertion put forth.

The same is true in regard to mental and nervous fatigue, for undoubtedly the nerve cells of the body undergo the same changes as those of the muscles under the stimulus of work, and require the same renewal.

Human fatigue, then, is often the cry "enough," or "too much," from tissues whose powers have been taxed almost to a breaking point, and neurasthenia or "nervous prostration" is a composite condition, due to prolonged and excessive expenditure of energy, and is really a later and more pronounced stage of fatigue.

2. CAUSES OF PHYSICAL AND MENTAL FATIGUE.

We have already hinted at the basic cause of excessive fatigue, as a failure of the system to repair fully and promptly the wear and tear of muscular or mental fiber, which may or may not have been more than the average healthy frame could or should stand. And here, as in so many phases of life, the personal equation is an all important factor which is commonly overlooked or neglected. A load or work which would not be excessive for a powerful dray or farm horse will exhaust a lady's saddle horse; while

again the former can be weakened by insufficient food or improper care so that ordinary work becomes excessive, whereas the latter can be stimulated by extra feeding and care, so that for a while, at least, it can do excessive work without undue exhaustion.

It is undoubtedly just so in regard to human work and fatigue, and yet, unfortunately, in the larger proportion of instances there is relatively little, and often no consideration given to the adaptation of the task of the individual, or to the proper physical or mental care necessary to secure the highest efficiency of work.

Thus the causes of excessive fatigue often rest also very largely in the individual and in the conduct of life, which latter may be the result of circumstances beyond control, but perhaps quite as often from ignorance or folly. While low wages undoubtedly play an important part in many cases, leading to lowered nutrition, and while poor light and ventilation may contribute their quota to the depressing effects, there is a vast amount of ignorance and neglect of the principles of diet, hygiene, and sanitation on the part of those employed, which is often at the bottom of the excessive fatigue which leads to a physical and nervous breakdown. If the wisest and best principles of nutrition could always be carried out there is little doubt but that the wages secured would in most instances supply an abundance of nutrition. The extravagance and waste of the poorer classes is proverbial; enough calories to carry on good nutrition could be obtained at even a fraction of the cost sometimes expended for food, if they only knew how.

Also in the matter of recreation, rest, and sleep, those who work hard often fail entirely in securing the recuperation necessary for the renewal of their labors day by day. The hours of actual work have been gradually lessened, by one means and another, so that now few have hours which are excessive, but the remaining time is seldom wisely spent. I speak from a very considerable knowledge of workers of all kinds, physical and mental, as I have taken pains to investigate these matters for years, in my endeavor to raise the vitality of my patients. Continually I find great carelessness in regard to the hours of sleep;

and rapidity of eating, open-air exercise, etc. Too few realize that recreation is abused, and when indulged in is rather *wreck-recreation*, than *re-creation*; I often tell patients that the true *re-creation* is found in sleep, and not in theaters, dancing, and various amusements which interfere with the proper hours of sleep.

3. DAMAGE TO THE INDIVIDUAL WHEN NEGLECTED.

Excessive fatigue when neglected leads to a depression of vital powers to such a degree that recuperation is not possible under a continuance of the same conditions of life and work; indeed when these are persisted in there is a continued lowering of vitality, so that each day one is less able to bear the exhausting fatigue, and thus a vicious circle is formed, often ending in a complete breakdown. True, this is often not recognized for a while, but the individual, finding each day's work harder, exercises more and more will power, and, like a hard master, forces the unwilling slave to do work, physical or mental, with increasing disability until a breakdown occurs.

Few grasp sufficiently the fact that lowered vitality leads to many diseases which either shorten life or develop invalidism. Surrounded as we are by multitudes of micro-organisms, many of which are beneficent and many injurious, a full vitality with active metabolism makes proper use of those favorable to life but succumbs to those which are harmful. We all know that the tubercle bacillus is almost omnipresent, and pathologists state that every autopsy can show evidence of some slight invasion by this micro-organism, and yet relatively few come under its full influence and develop signs which can be recognized as active tuberculosis; and we all recognize now that those who are thus affected are those who suffer from lowered nutrition, often caused by prolonged and excessive fatigue. The same may be said in regard to pus cocci and many other microbes, and nature has provided phagocytes which in healthy blood continually guard us against their harmful influence, but which fail in this duty when the vital system is lowered by excessive fatigue, either physical or mental.

In operative work it must never be forgotten that fatigue increases greatly the danger of accidents from machinery, which sometimes are of a very distressing nature.

4. INJURY TO THE INDUSTRY.

Many of the great industries are recognizing that efficiency of work is best attained when perfect vitality of their operatives is secured, and happily very great advances have been made in many directions in regard to reaching this end; but unfortunately there are multitudes of other industries, great and small, where no such far-sighted policy prevails. There is need, therefore, of much education and enlightenment, not only in the interest of the employed but also on behalf of the industry or occupation, for those who have adopted this course testify to even its great pecuniary benefit to all concerned.

There can be no question that with excessive fatigue productive capacity is lessened, whether in physical or mental occupations. With a lassitude engendered by lowered vitality, movements are slower and less certain and injury to fabrics and machinery occur more readily, and time is lost. The steel industry has fully grasped this, through the intelligent and energetic work of its Secretary for Welfare, Dr. Thomas Darlington, late Health Commissioner of New York City, who has been the means of immensely improving the health, social condition, and surroundings of its operatives.

It has been my lot to see and treat a large number of public school-teachers, as also secretaries and stenographers, and others engaged in mental pursuits, who have suffered so from fatigue that their work has been hindered greatly, as many of them recognize. There is certainly need of enlightenment of those who are over them, in order that the greatest efficiency may be obtained from their efforts.

5. REMEDIES.

Knowing and realizing the cause is the first step toward rectifying any evil, and in the present instance the whole matter may be summed up in the single word education, both of the em-

ployer and the employed. But perhaps there should be added to this a conscientious appreciation, acceptance of, and action upon all the facts of the case.

The employer should realize both his moral responsibility to the human beings whom Providence has placed under his control, and apply the Golden Rule to them, both for their interest and his own. The modern rush after success has blunted the susceptibilities of employers, who too often grind down their fellow beings, so as to get the last drop of blood out of them, with no thought of their welfare or really of their own best interests. When employers fully grasp and realize the true facts of the case there will be less fatigue of their employees.

But there is also great room for intelligent education of the employees, and in this work physicians must and should take the greatest part. They alone know the human frame and what it can stand, and they alone are capable of warning and properly instructing workers in all fields, physical and mental, as to the proper conservation of their energies. It is our duty, line upon line and precept upon precept, to instruct workers in regard to diet and hygiene, to warn those who are slowly yielding to fatigue, and to so regulate their lives that their efficiency, both in the present and future, may not be impaired. From very considerable experience I believe that this can be done, and if we physicians take every opportunity of warning, teaching, and guiding all who may come under our influence in regard to the principles of healthy living there will be fewer instances of injury of all kinds from fatigue.

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VII.

LIGHT IN THE INDUSTRIES.

By EDWARD JACKSON, M.D., Denver, Colorado.

To speak of the "menace to health from light in the industries" suggests the school-boy's statement that "salt is what spoils the bread, when the cook leaves it out." Light hurts the eyes when they do not get enough of it. Any one who has attempted photography knows the enormous difference between indoor and outdoor exposures. The film or plate that gives a good negative in one-twenty-fifth of a second outdoors, requires one or several seconds indoors by good daylight, and as many minutes by artificial illumination. The actinic effect of good outdoor light is many times, or many hundreds of times, as great as that of ordinary indoor illumination.

Outdoor industries present no problems as to illumination, except when carried over into the hours of natural darkness. The farmer, the sailor, the man digging in the ditch make no complaint of the light in which they work. *If outdoor light is complained of it is by the indoor worker*, who suffers not from excessive light, but from excessive contrast. The adaptive power of the eye, by which light varying thousands of times in photometric power is yet serviceable for vision, can be impaired by habitually deficient illumination, or strained by excessively great or sudden demands upon it.

Contrasts become a source of inconvenience or actual pain. These we always associate with the active processes of light adaptation, feeling the bright light to be excessive. The glaring street lights, so unpleasant at night, would scarcely be noticed, much less cause discomfort, if turned on at mid-day. Many of us have noticed how different from their glare at night is the soft effect produced when they are turned on in the twilight. To go from a dark interior into full noon-day sunlight is always unpleasant. But the gradual transitions of the night and day out doors are noticed only with pleasure. *Excessive contrast, either*

simultaneous or successive, is responsible for nearly all the fear of bright light.

Bright light falling not on the thing looked at, but directly on the eye from near the direction it is looking, causes contraction of the pupil, lessens the light received from the object we are endeavoring to see; and thus actually makes it more difficult to see, besides causing the discomfort of contrast. Looking directly at the sun without protective glasses, or at an accidental brilliant electric flash may injure the retina. But these scarcely figure in the industries, where the danger is practically always from deficiency not from excess of light.

As to the *quality of the light*, as regards its color or wave length, we are now in an era of investigation and experiment. Of the results thus far arrived at it is only needful to say that they seem to agree entirely with what would be expected on the evolutionary hypothesis; that the mixture we know as white light, the ordinary daylight, is the light to which the eye is best adapted; and that the center of the solar spectrum, the yellowish green, is the most efficient portion. The relative harmfulness of ultra-red and ultra-violet rays still remains debatable. Daylight is best. The shifting of the hours of labor to secure it in a greater proportion of the working day is a real hygienic measure that has recently been put into effect in some of our cities. If daylight is not obtainable, then the closest possible imitation of it is the ideal to be aimed at.

Steadiness of illumination is extremely important. Superior steadiness is a great advance that incandescent mantles and filaments have made over flames, and arc lights. Adaptation is the power that enormously extends the usefulness of our eyes, and it is brought into play with every change in the illumination to which they are exposed. To the dark-adapted eye bright light is dazzling and unpleasant. To the light-adapted eye feeble illumination is insufficient and baffling. The rapid variation of the brilliancy of light catches the eye always adapted to the other sort of illumination, and therefore at a disadvantage.

One other quality of illumination must be noticed: *Is the light diffuse or concentrated?* Does the needed light come from a

large area, or from a single point? The more concentrated it is, the more brilliant that small area must be, to furnish enough light; and the stronger will be the contrast with surrounding darkness, and the more unpleasant and harmful, if the source of light is placed where it can send rays directly into the eye. Even if the eye is effectively shielded from the source of light, sharpness of contrast is generally to be avoided. Here is where indirect lighting systems show superiority. For reading, writing, and many other kinds of work, diffuse illumination is best. But it is not best for all. In sewing, with thread having the same color as the material on which it is used, or in reading from the fine graduation of a metal or glass scale, sufficient contrast may only be obtainable in a light that gives strong sharp shadows. In respect to concentration or diffusion, the light must be adapted to the particular work that is to be done by it.

The direction in which the light falls upon the work is of very great importance. Generally it should come from above and behind the worker. The relations of the eyes, hands, and working position of the body are such that our work is mostly in front of us, below the level of the eyes. Light coming from above and behind falls fully on the side of the object we look at, on the part to which the worker's attention is directed.

If it come from squarely behind, the shadow of the head or body will be thrown on the work. But it may come over one shoulder, either shoulder except for writing and work of that sort. If it came from over the right shoulder when writing in the ordinary manner, the shadow of the hand would be thrown about the point of the pen. Therefore the common rule is to have it come from over the left shoulder. But in general the light must come from above. For fine work, that from time to time the worker must bend down to see, from above is the only direction that light can come to be of any service. It is light coming from above, from which the eye is best protected by brow and lashes against the harm from dazzling by light shining directly into the eye.

Fortunately in providing for artificial illumination this requirement of having it come from above is generally met. Sometimes it is not so far above the worker as to save the eyes from

direct rays; but the benefit of shading the eyes from the source of light is coming to be understood, the inverted gas mantle is so well worked out, the electric lamp is so easily suspended from above, the ceiling offers such a convenient and natural means of indirect illumination, that with artificial illumination this matter of the direction in which the light should fall upon the work is likely to be well taken care of.

But for the supply of daylight no such rational provision has been made. Our dwellings and our workshops, in the way they are lighted, still bear marks of similarity to the primitive huts or the caves in which our ancestors may have stored their possessions, or taken refuge from storm or cold and enemies by night, but in which they never planned to spend their days and do exacting eye-work. The light coming in horizontally from a distant window, or falling on the floor, and thence diffused upon the ceiling, before it can be reflected on the work is much more suggestive of the light coming in from the mouth of a cave, than of any scientific arrangement for efficient illumination. In the building of to-day there is still too much of the castle, planned chiefly for defence; or the monastery designed to favor introspection rather than observation.

While the illuminating engineers, seeking to introduce new systems securely covered by patents, have enormously improved the means at command for artificial lighting, no such service has been rendered with regard to plans for utilizing the best, cheapest and most general source of light, ordinary daylight. Almost the only attempts to have daylight fall in the right direction on work, have been by skylight, available for only a single story, or by utilizing a single favorable position close to a north window. For the south side of a building, where the greatest amount of light is available, the practical suggestion has been to exclude light by shades or to wall it up solidly, to save the eyes from the unpleasant contrast of the strongly lighted floor.

Bad as has been our architecture as regards the indoor use of daylight, it has been supplemented by the daily practice with regard to the exclusion from our buildings of such light as might get in through the openings left to look out of. Shades are hung

so as to cut off the light from the upper part, the only part of the window valuable for indoor illumination. "Blinds" are made to give alternate streaks of light and darkness emphasizing the annoyance of contrasts. And in work-shops dust is generally allowed to accumulate on glass windows, until their capacity to admit light is cut down to one-half or one-tenth of what it might be. When all this occurs inside, little thought will be given to what is outside the window, whether it be clear sky, a dark wall, or a tree.

There is danger in the industries from the tendency to make inadequate provision for daylight; and then to depend on artificial illumination. *Artificial illumination is mitigated darkness.* Properly planned it may serve in a way the purposes of ocular labor, but it serves but poorly the more general purposes of life. Life can exist in darkness, but poorly and on a lowered plane. Aside from their rudimentary eyes cave-dwelling species are generally of less perfect organization than the nearly related species that dwell on the surface of the earth.

The connection of pigmentation with general nutritive processes is a deep and essential one running back to primitive forms of life. Sensitiveness to light is one of the general properties of living matter. Light must be placed with temperature and oxygen as an essential condition of any high organic development. Buried in our language are the results of countless experiences of the race; a "bright prospect," a "sunny disposition," "radiant with joy," are phrases that with their opposites, a "dark outlook," "black despair," a "clouded life," illustrate the general need for light, the depressing effect of clouds and darkness. "Bad weather," a "perfect day" each carries its implication as to light, and they have definite meanings to all of us. We may have blunted our pleasure, diminished our capacity for enjoyment of outdoor living, but none of us has reversed the race estimate of light and shadow.

It is worth while to consider how far the worker has been deprived, by habitual indoor living with deficient daylight, of the benefits of the general influence of light on nutrition, and its value in cheerfulness, hope, courage, and quickened intellectual

processes. Certainly the seriousness of the waste must be noted **with** the newer demands for efficiency. This consideration alone is sufficient reason for totally revising our provisions for daylight **indoors**; aside from the more definite and better understood demands for such revision that arise from accidents from machinery poorly illuminated, or the injury to the eye, and the strain on its related parts of the nervous system caused by working by inferior light.

The menace to health as regards light in the industries is the utter disregard of the essential principles of illumination by daylight, and the tendency to substitute for daylight artificial light which enables the work to be done, but leaves the worker the worse for it, deprived of the general benefits of natural illumination essential to a high standard of permanent health.

The stimulated and excessive growth of land values in cities, causing the erection of high buildings without any attempt to control their effect on daylight illumination, by building restrictions, requiring correspondingly wide spaces between them, and the perfecting of artificial lighting for technical use, without any attention to a scientific system of introducing daylight into our buildings, raises a real danger to health that ought to be considered and dealt with.

The most important step now to be taken is the abundant lighting with daylight of the upper part of our rooms, from which direction its benefits can be enjoyed without annoyance to our oversensitized indoor eyes. At the same time a high regard for health would compel us take as many of our industries as possible into the conditions of outdoor light and open air.

This is scarcely the occasion to discuss particular industries and conditions. But the harm of deficient illumination shown most strikingly in the diseased eyes and pale faces of mine workers, or the victims of sweat-shops, is a menace only less in degree to all whose lives are spent indoors, removed from the influence of normal daylight.

VIII.

HEAT AND VENTILATION.

By JOHN ROACH, Inspector of the Department of Labor of the State of New Jersey, Trenton.

The question of properly heating work rooms is one of the most serious importance and has engaged the earnest attention of the engineering profession. The question of providing mechanical heating has been given some consideration by State Departments of Labor but probably has not been worked out so that positive specifications could be issued that would cover a variety of work shops. Quite generally I think engineers have agreed that the following room temperatures are acceptable:

Public buildings, 68 to 72 degrees.

Machine shops, 60 to 65 degrees.

Foundries, 50 to 60 degrees.

In printing establishments where a high temperature is required on account of the necessity of greater heat to make the ink run true, a temperature of from 82 to 90 degrees is necessary.

Generally the law covering heating in the various states says that work shops shall be heated in a satisfactory manner. This may mean little or nothing. If the workers can stand the temperature they will work, if they can not they will go home. The employer who wishes to get the best work from his workers will study the nature of the work and the comfort of the worker to do his best under a set condition. The New Jersey law simply requires workrooms to be suitably heated. Under ordinary circumstances this is not hard to do for no money is to be made in maintaining cold work rooms with numb-fingered workers who are unable to give a good account of their day's labor.

FOUNDRY.

In foundries the problem of providing proper heat is much more acute, for foundry buildings are generally so large that the question of heat is a most important factor. Many foundries depend on direct radiation from steam pipes along the sides of the foundry room and in case of extreme cold weather they persist in using an

open type of coal or coke burner known as a "salamander." In New Jersey the use of the "salamander" is discouraged for the fumes from the fires poison the air and workers can not do their best when working under such conditions. All open stoves must be piped to the outer air and where traveling cranes are used this offers another problem to be considered. The question of providing sufficient heat for foundries has been met by the installation of blower systems that distribute a sufficient quantity of heated air throughout the foundry room at a velocity of from 300 to 500 feet per minute and that maintain nearly an even temperature of from 55 to 60 degrees. In a recent conference on this subject that was held between the Commissioner of Labor and a Foundrymen's Association the very interesting point was brought out that the proper heating of a foundry was not only healthful to the employees but more economical to the employer. The works manager of a very large foundry located in New Jersey stated that when his firm was using the old type of open stove, or "salamander," it cost about thirteen dollars per day in cold weather to provide a sufficient amount of heat. A blower system for furnishing heat was installed and the exhaust steam from the boilers was used, with the result that this expense was eliminated and the only cost incurred was the initial cost of installation which was about thirty-five hundred dollars.

FOUNDRY VENTILATION.

A system of heating of this kind is not only useful for providing heat but it aids materially in freeing a foundry of dangerous gases generated by the process of casting molten metal. A properly designed system will do very much more than heat a foundry. One of the serious questions confronting foundrymen is the question of providing a free exit for fumes. In some cases exhaust fans have been installed but these have proved to be inadequate. Foundries have such a large cubical content that exhaust fans make practically no impression on them. The best method for moving gases and vapor out of a foundry is to have a monitor running the entire length of the foundry roof, with windows hung on pivots that can be easily opened from the

foundry floor. Pipes should be arranged throughout the room so that an equitable air pressure can be introduced and this introduction of air on a breathing line with the worker will lift the fumes and gases out through the monitor.

FACTORY HYGIENE.

Probably the most difficult problem for the various Departments of Labor to solve is not the safeguarding of machinery or fire prevention or protection. These matters are undoubtedly important but the impression is beginning to gain ground that the question of factory hygiene is yet more essential to the worker. The fact that this is not generally understood; that the fight against industrial disease is practically new in America; that not only employers but the workers themselves have accepted the doctrine that certain trades are inherently dangerous, gives the public no clue to the tasks which confront Departments of Labor.

The Department of Labor of New Jersey has not proceeded on any general theory of providing certain air changes and air conditions in factories in order to safeguard the health of operatives. It has endeavored to control and remove all dangerous dusts, heat and gases at the point where they are generated in trade processes before they have an opportunity of injuring the worker. A very interesting statement was submitted to the Department by the secretary of the Polishers and Buffers Union of Newark in this connection. The statement showed that the death rate from tuberculosis in this trade was 50 per 1000 in 1904. In 1913 the death rate was 6 per 1000. The blower law which requires all buffing and polishing wheels to be provided with an exhaust system to remove dust went into effect in 1904. It is not at all unreasonable to assume that when this law shall have had time to operate perfectly that the death rate from tuberculosis in this trade can be reduced to a minimum.

There is no form of suffering so terrible, more needless or more destructive of future usefulness than the insidious lead dust, or lead fumes met with and ignored on every hand. Mercury poisoning, producing anemia and a peculiar sort of palsey known as mercurial shakes, has existed in Newark and Orange hat

factories for half a century. Efficient exhaust systems are now being installed to control and remove dust and fumes at the point where they are generated which will probably prevent a recurrence of these ills. In the lead smelters, regulations are being introduced that will care for the dusts and fumes that in the past have created havoc, and washing facilities must be provided to enable the workers to safeguard their health properly. How acute the need for these reforms are may be gained from a knowledge of the fact that one sweater furnace in New Jersey has a record of seventeen victims of paralysis during the past five years. Two brothers have been victims of wrist drop, among this number. One lead kettle in a pipe works has produced two cases of paralysis and three of lead colic. The charging gang of a lead blast furnisht scores of victims of colic and paralysis representing from ten to twenty days work only.

In the years that are past a large part of the industrial poisoning resulted from an ignorance of the dangerous nature of trade compounds. The workers were not aware of the hazards, and the general public were too busy with their own affairs to be interested. In New Jersey, however, a careful survey has been made of a number of dangerous trade processes, notably the dry color houses, smelters, brass foundries, metal polishing, rubber mills, cotton and flax mills, printing trades and lead industry with a view of determining the best methods to safeguard the worker.

While it may seem a far cry from these matters to the subject of proper ventilation still I think practical men will agree if we keep dangerous fumes and dusts from coming in contact with the worker we will have gone a long way to eliminate many of the hazards that surround occupations.

During the year ending October 31, 1913, the Department of Labor had 1900 buffing and polishing wheels covered with exhaust systems of the most efficient type. In addition to this 750 wheels were under contract for the new system. The exhaust system used in New Jersey requires a very strong air suction and was the first of its kind to be adopted in this country. In the old days very little attention was given to exhaust systems and Departments of Labor were generally quite willing to accept

any kind of piping. Under the New Jersey specifications, exhaust systems must develop a suction sufficient to raise 2 inches of water in a U-shaped tube within 15 inches of the hood. This positively insures the control of any kind of dust or fumes.

In the control of fumes a special type of hood is used and an air movement equivalent to 1000 feet per minute is required. Specific standards have been established for all kinds of fumes and dust removal so that a manufacturer when he is ordered to correct a certain evil may know just how to do it. In the metal novelty trade large quantities of nitric, muriatic and sulphuric acids are used as a part of the trade process: ducts, designed to draw these fumes away from the tanks or jars where the acids are used and before they shall have had time to pollute the air that is breathed by the worker, are being installed.

In the old days, owing to faulty construction, hoods used for this purpose were a menace rather than a help to the worker; the fumes were drawn up on the breathing line and then out through the hood. Now the idea is to draw the fumes away from the face of the worker before he has a chance to breathe them. Until very recently in the hatting industry the question of steam control in the sizing or plank shop seemed impossible of settlement. In wet weather or cold weather the steam from the sizing tanks would gather in such quantities that it would be impossible to distinguish a human form at a distance of three feet. Men worked in this steam-laden atmosphere for nine hours a day. As a consequence rheumatism and tubercular troubles prevailed and one large insurance company established rates so high as to be practically prohibitive. After an investigation covering a period of about two years the Department of Labor adopted specifications covering the installation of exhaust systems to abolish this evil. A number of these installations have been made and conditions in plank shops are very greatly improved. Dust conditions in hat shops have been covered by specially designed exhaust systems so that it is only fair to assume that the hat workers' health can be so protected as to make the work reasonably safe.

IX.

CROWDING, IN RELATION TO THE HEALTH OF WORKING PEOPLE.

By CHARLES RICHMOND HENDERSON, D.D., PH.D., Prof. of Sociology, University of Chicago.

This is a non-medical social worker's plea for the counsel, help and authoritative direction of community effort to battle with a serious and growing evil.

The plan of this discussion requires each writer to isolate a cause of physical injury which in fact cannot be isolated except in imagination. Crowding is an evil which belongs in a system of evils, each of which is reverberated in all the others.¹ Therefore the emphasis of one aspect may seem to be exaggerated, unless the circumstances of the discussion are kept in mind. The other papers will correct any want of balance in this contribution.

This topic is placed under "miscellaneous" factors in physical conditions surrounding the operation, and crowding is treated in the analysis as coordinate with light, heat and ventilation, noise, food, home surroundings, improper recreations, drug abuse.

Crowding is an inevitable consequence of increase of population and the formation of industrial towns about huge shops, mills and mines. Land does not stretch with growth of population. As land rises in value the temptation to crowd, to save

¹ The complexity of causes and the contradictions in statistics are only too apt to cause scepticism about the reality or importance of crowding. After giving some of those vexing figures which obscure this factor the American Journal of Public Health (Feb., 1914, p. 131) concluded: "For decency's sake, for morality and for ethical reasons, the demand for better housing should never cease, but sanitarians must begin to divert attention to racial and other factors of population." When attention of the public is shunted off the main track into this swamp of race trails we can hardly hope for progress short of the millenium. Professor Boas seems to have shown us that supposed "race traits" are changed in a generation of greater comfort and good feeding. And Professor E. O. Jordan, in a protest published later in the Journal of Public Health, says: "This attitude seems to be based on a fundamental misconception. It does not follow that because the factor of racial susceptibility may be so powerful in some instances as to obscure completely the factor of bad housing, the latter is not operative at all. . . . This declaration seems to mean that housing is practically negligible, as a public health factor. . . . We do not believe that this position is tenable." Professor Jordan proceeds to cite facts and authorities for his contention that the sanitary aspects of housing should not be minimized.

rent, becomes more intense. Nations must, therefore, seek to provide against physical ruin caused by congestion, an accompaniment of progress.

Crowding is found in all the places where wage-earning men and women live and toil; in the dwelling, the workplace, in halls of recreation and worship, in courts and prisons.

I. CROWDED DWELLINGS.

First of all we must define what we mean by "crowding" or "congestion."

1. There may be too many people in an urban district, and the ground may be covered with dwellings and shops to the exclusion of open spaces, room for travel, traffic, light, movement of air. The area taken as a unit for a neighborhood is not easily fixed; approximately it is a space found convenient for a school district.

2. The block may be crowded in two ways: by covering too much of the ground with buildings, and by carrying the buildings too high. Health requires that space be left in each block for light, for the free circulation of air, and for the play of little children, even where a small park is not very distant. A city which makes provision only for celibates or childless couples has made its contribution to "race suicide."

The excessive height of the buildings endangers health in various ways: it breaks down the poor women who must carry food, fuel and babies up and down several flights of stairs. With the population of each story noise, odors, confusion, nerve-racking friction are increased, and areas of darkness are enlarged; the lower stories may be unfit for habitation.

3. There is crowding of rooms in each dwelling. It is true, as Veiller insists, that the standard of so many cubic feet for each person is inaccurate, unless we take into account the circulation of air, the entrance of germ-killing light, and the composition of the domestic group; and yet the space occupied is a vital matter.

Vitiation of the air in sleeping and living rooms is a common source of depression. Investigations in various cities have re-

vealed the fact that single men, immigrants, laborers in the great industries, sleep in crowded rooms, with windows nailed fast to prevent drafts, and in two shifts; the same beds are used night and day by the lodgers.¹

Doctor Oliver says: "The bad effects of overcrowding and of sleeping in ill-ventilated rooms are seen in the readiness with which fatigue is induced and in the inability of workers thus imperfectly housed to keep pace with their healthier comrades and the increased speed at which machinery is run."²

In this connection we have to deal with the cheap lodging houses where still, in spite of regulations and inspection of health authorities, the miserable quarters reek with foul air, and the slightest attempts at ventilation by windows are resisted by the shivering wanderers who are trying to keep warm.

Even in municipal lodging houses and police stations the conditions described years ago by Wyckoff (in "The Workers") still exist, to our shame and injury, especially in midwinter when there are many unemployed, unmarried men, who flock to the cities for low satisfactions and excitement in a dreary existence.

R. C. Chapin³ has sought to apply a standard to the conditions observed in our largest city. "The amount paid for rent increases with increase of income." "The average number of rooms per family increases with income." Poor folks have poor dwellings, which makes them poorer still. Fifty-three per cent. of the 391 families studied reported dark rooms. Not more than one-quarter of the families have both room and toilet below \$1100 income.

His standard of crowding (p. 80) is: more than 6 persons to 4 rooms, and more than 4 persons to 3 rooms.

In the lower income groups, overcrowding is the rule. Overcrowding is more frequent among families where the father is not the sole bread-winner.

Lodgers are more common with the overcrowded families;

¹ Miss Abbott, authority in matters of immigration, declares rightly that no program of housing touches the origin of evil which omits dealing drastically with this crowding of lodgers.

² "Diseases of Occupation," p. 2.

³ 1909. "The Standard of Living among Workingmen's Families in New York City," p. 75ff.

29 per cent. of 318 families with income between \$600 and \$1100 have lodgers.

*Testimony of the Evils of Overcrowding.*¹

In the endeavor to reduce rent among the very poor, they pack themselves into a limited space at cost of vitality, directly and indirectly. Even thrifty people, if ignorant, who are not economically compelled to accept injurious conditions, will do so in order to have more to spend in luxuries or to save.

"The medical officer of the London County Council has shown that the death rate steadily increases with the density of population."²

The Secretary of the New York Tenement House Commission of 1894 (Report, p. 12) says that overcrowding has evil effects of various kinds, for example: "Keeping children up and out of doors until midnight in warm weather, because rooms are undurable; making cleanliness of house and street difficult; filling the air with unwholesome emanations and foul odors of every kind; producing a state of nervous tension and interfering with the separateness of home life; leading to a promiscuous mixing of all ages and sexes in a single room, thus breaking down the barriers of modesty and conducing to the corruption of the young, and occasionally to revolting crimes." The Royal Commission of 1884, in London, gathered a wealth of testimony on the evils of overcrowding.³ In England the school board visitors, clergymen, charity agents, and others know far more intelligently and intimately than similar workers in this country the lives of the poor in their homes. From their testimony it was gathered that immorality, sexuality, drunkenness, pauperism, and many forms of debauchery were caused in some instances, in others abetted, by the indecent overcrowding which existed. The testimony further showed most distressing physical results due to overcrowding. High death rates, a pitiful increase in infant mortality, terrible suffering among little children; scrofula and congenital diseases; ophthalmia, due to dark, ill-ventilated, over-

¹ "Tenement Conditions in Chicago," p. 51.

² Bowmaker, "Housing of the Working Classes," p. 15.

³ Report, "Housing of Working Classes," Vol. I, pp. 13-14.

crowded rooms; sheer exhaustion and inability to work; encouragement of infectious diseases, reducing physical stamina, and thus producing consumption and diseases arising from general debility, were some of the evils of overcrowding.

When the dwelling must perform the double function of habitation and workshop, the evils are increased. The rooms are occupied day and night, without intervals for ventilation; particles of dust are torn or worn off the materials of manufacture and float without cessation into the irritated and sensitive lungs; the fires of the ironing apparatus make the temperature feverish and the nauseous vapors of the washing infect the atmosphere with their sickening odors, so that the very food becomes loathsome; the clatter and jar of the work keeps the nerves tense and strained; the rest needed by the infants and younger children is destroyed and the assimilation of food is disturbed.

And yet if we seek for exact scientific proof of these impressions which all social workers have received from their constant contacts with the urban poor, we find it difficult to discover satisfactory evidence. Here is a field for accurate investigation yet to be explored by competent persons.¹ Professor Winslow says: "In one of the most careful of such studies, for example (L. M. Bristol: *The Relation of Congestion of Population to Mortality in Boston*, New Boston, 1,201) results were obtained which indicate a direct relation between overcrowding and a high death rate, the highest comparative mortality, over 160, occurring in districts with 12 persons per dwelling, and the lowest, under 90, with 7 persons per dwelling. In the January, 1911, *Monthly Bulletin of the New York City Board of Health*, interesting statistics for infant mortality in certain blocks were given which showed a rate of 50.8 deaths per 1,000 births in a poor residential district with 216.9 persons to the acre, against 318.8 deaths per 1,000 births in a negro quarter with 1051.1 persons to the acre." Such facts seem to be conclusive; yet we must not rashly stop with them. In the same New York document we find that in the most crowded district studied, with 2471.9 persons to the

¹ Prof. C.-E. A. Winslow, "Proceedings of American Association for Study and Prevention of Infant Mortality," 1911, p. 149.

acre, there were only 156.4 deaths per 1000 births. In Chicago, in the old Seventh Ward, the death rate was only 11.99 per 1000, while in the neighboring ward it was 45.9 per cent. higher. The sanitary conditions in both wards are equally bad, but where the Jews lived the rate was lowest ("Tenement Conditions in Chicago," p. 158). Racial tenacity of life, sanitary living, tender care of infants and many other factors enter into the problem and must be separately weighed before really scientific conclusions can be reached.

It gives some of us a mental wrench to accept the new theories of ventilation; but we must revise our antiquated notions on the subject. We can no longer accept the number of cubic feet of space in a dwelling room as a sufficient standard. We must take into account the windows, the movement of air, the quality of the surrounding atmosphere, the relative moisture, the temperature of the house.

It should not surprise us to find in future municipal building codes requirements for electric fans, exhaust pipes, apparatus for control of moisture and temperature, as well as window and floor space.¹

II. IN THE WORKSHOP.

In the workplace we encounter the same principles of hygiene, the same complexity of causes, the same difficulty of giving due weight to the single factor of crowding, and so it is needless to repeat what has been said in connection with depressing conditions at home.

We may, however, call special attention to the increased danger of external injuries, so-called "accidents" of industry, which arise from moving machinery and from the collision of persons working in a narrow space, near traps, elevators, stairways.

In the cramped quarters where sewing women and men manufacture garments at furious pace, in stifling and ill-lighted halls, for long hours, the immunity to tuberculosis and pneumonia is often lost, and the moments of exposure are multiplied. Crowding, must, therefore, be considered as a coöperating cause in con-

¹ Lawrence Veller, "Room Overcrowding and the Lodger Evil," National Housing Publication, No. 18.

nection with related causes, for the shortening of life and the depreciation of industrial efficiency.

III. IN HALLS OF RECREATION.

The public halls in which, especially in winter time in our northern climate, millions of working people seek their recreation, amusement, fellowship and culture, are frequently cultivating tubes of colonies of deadly microbes, which turn happy gaiety into fever and sadness. The sudden popularity of the moving picture shows has thrust upon health authorities many new and vexing problems. The multitudes have no hygienic standards; so long as they are not in a freezing draft of chilling air, or positively boiling in a steaming and superheated atmosphere, they make no complaint. Poor, ignorant mob, they need to be protected against themselves! Fortunately, the people are capable of understanding instruction when backed by professional authority; and the picture show itself has become a medium of popularizing the science which saves life.

IV. IN PUBLIC INSTITUTIONS.

Workmen furnish a certain contingent to the population of our city lockups and county jails; they serve on juries in vast numbers; and in their search for employment many an honest country lad meets his physical and moral doom in a cheap lodging house.

Any one who has studied the ordinary city lockup and county jail devoutly wishes that each judge, sheriff, and chief of police could be made to spend a night once a month in the vile dens which our civilization tolerates. And if preachers and editors could be made to take their turn at the same experience, pulpits and newspapers would never cease to raise an outcry against the shameful condition.

I have been searching medical and public health journals for protests against this infamy and menace—in vain; perhaps some one with a sharper eye will call attention to articles which I have not been able to discover, and I would be grateful for references.

It is useless for us laymen to protest, as we have¹ done for thirty years. Judges, lawyers, police, all turn a deaf ear to us; they listen only to professional experts.

We have permitted the architects, steel-construction people, and authorities to continue building for these places of detention a type of habitation which is condemned for sleeping rooms, offices, kitchens and even for hen-coops and cow-stables. The "Bull pen" is a costly steel cage, constructed in the center of a vast chamber, and the cage is surrounded by a corridor where innocent and guilty are forced to associate in a common hall, and where the most depraved and satanic character is hero and ruler. The air is loaded with corruption, with infection, with curses, with obscurity. The light of heaven fades away in its passage from the window to the interior of the cell, and I have seen corridors which had no external window whatever.

When we consider how readily many policemen arrest men who are not criminal and who are at once discharged by the court from want of evidence; when we remember that any one of us may be thrust into one of these black holes at midnight in a strange city, especially if we are poor and unknown; when we consider that those thus subjected to physical and moral contamination go out in all directions to infect others; the apathy of the medical profession is discouraging beyond expression.

Crowding in these vile dungeons often reaches the point of purgatory. There is no privacy. The clean young fellow who is arrested on suspicion, the honest mechanic who is intoxicated, the mere accidental witness may be compelled to share a lousy bed or dirty board with some unspeakably offensive degenerate to whom this perdition is joy and light, as compared with the barrel under a sidewalk when the thermometer is at zero.

Why should we not provide at least a narrow, though clean and ventilated cell for every person arrested? Why should we not require that that cell have at least a bit of window opening to the sky, the sun and the pure outside air? Why should not that cell be walled with concrete and the surface finished so it could be washed clean every day or disinfected if required?

¹ Report on jails, by the writer, American Prison Association, 1907.

If any one who either has not seen these places, or looked at them unmoved because he had no standard, thinks I have used strong language, I can only retort that I would have used more forcible and adequate epithets if I could find them.

V. HINTS FOR AMELIORATION.

This part of the subject is reserved for others; but I may be permitted to indicate a few lines of investigation:

1. The periodical inspection of workmen, by authority, in all occupations to discover defects and incipient disease.
2. The making of records of the occupational history of every man who comes under medical care.
3. The construction of medical standards of judgment on all the points here considered, as a guide to public opinion, legislation and administration.
4. Coöperation of all social workers, under medical direction, to secure the embodiment of advanced standards in building codes, in protective legislation, and in sanitary regulations of shops, dwellings and public buildings.

It has been shown that no one physical cause of disease can be isolated from the complex of depressing conditions; it needs also to be pointed out that the social causes are even now complex and entangled. Many people crowd their dwellings and take in lodgers because they are wretchedly poor. If society requires a minimum space for residence, it must also guarantee a minimum income to pay the rent; and this calls for poor relief, or for minimum wage, or for social insurance; and thus by studying closely one evil we launch upon a voyage of exploration in which we require the guidance of all the sciences at once. Thus also we realize how, in order to "lift up the manhood of the poor" all men of light and good will must coöperate.

X

HOW FOODS AND DRUGS CAN MENACE.

By WINFIELD SCOTT HALL, Ph.D., M.D., Professor of Physiology, Northwestern University Medical School, Chicago.

There is probably no field of personal and domestic hygiene in which the general practitioner of medicine finds more frequent necessity for instruction and counsel than that which concerns the relation of his patients to foods and drugs. This is true not only among his families on the boulevards and avenues, but also among those who occupy the narrow back streets, namely, the wage-earning operatives in factories and shops. As a matter of fact, the relation of these wage-earners to foods and drugs may contain an even greater menace to their health because in the case of the wage-earner we add to ignorance of the general principles of hygiene the economic factor.

So far as food concerns the wage-earner the menace is practically confined to two factors, namely, lack of information and lack of funds. These factors may operate singly or conjointly, but in either case they seriously complicate the condition.

In so far as drugs concern the wage-earner, we deal first with ignorance, then with several other factors such as example, desire, lack of will power, etc.

FOODS.

(I) UNWISE SELECTION OF FOODS.

(1) *Due to Lack of Information.*—The writer has frequently passed by a group of wage-earners at lunch and has incidentally noted the character of the average wage-earner's menu. For drink he will have either coffee or beer. There is certainly no objection to the former. If he adds a quart of beer instead of the coffee, it is probably due to the fact that his father before him used beer with his lunch, and the man in question has inherited from his ancestors the dogma that: "Beer is liquid bread." The lunch is not supposed to be complete without one or two cold fried pork chops or lamb chops and a piece of pie or cake or both, also some pickles.

Very frequently the writer has stepped into a lunch room for a bowl of "half-and-half" milk and cream with bread and has noticed incidentally a young wage-earner on his right ordering pie "à la mode" and coffee, while perhaps the young man on his left is regaling himself for his four or five hours of afternoon work with strawberry shortcake and coffee.

Finally, it is a common thing to observe the wife of a wage-earner in the market selecting foods of low food value, perhaps out of season and high-priced, selecting cuts of meat that are the most expensive and no more nourishing, the selection being determined either by the fact that the woman knew how to cook the expensive mutton chop or steak, but did not know how to cook the very much less expensive "boiling or stewing cut." The children from these families run bare-headed across the street to the delicatessen, perhaps just before or actually during the meal to buy some expensive material of doubtful nutritive value for dessert; and, finally, the baby in that same family may be given grossly improper foods, not at all adapted to its age and digestive powers, because the mother is lacking in information regarding just what the baby's needs are. Children of school age from these families spend enough pennies each day for cheap candy, gum, ice cream cones, and the like, to buy a loaf of bread, a pint of milk or two fresh eggs. All of this unfortunate choice of foods which involves not only waste of meagre funds, and provides food of doubtful value and perhaps actually harmful, is due to lack of information on the part of those who select the foods.

The well-informed mother of such a family will provide for her wage-earning husband and son lunches of bread, meat and coffee, perhaps a hard-boiled egg or two may be added to the lunch. If the coffee can be kept warm or can be made warm at lunch time, in the cold season of the year particularly, it affords the worker his warm lunch, and the meat sandwiches afford him proper and adequate nourishment for his afternoon work.

The well-informed man understands that a quart of beer, though costing as much as the loaf of bread, contains no more nourishment than one mouthful of bread. He will therefore not spend his nickel for that which is not bread. In a similar way

he would reason that coffee and pie or other rich dessert make a very inadequate and unsatisfactory lunch for a man who must do four or five hours of hard work. The same fifteen cents which he would pay for such a lunch, if expended for wisely selected foods, would pay for a lunch much more easily digested and containing three or five times as much nourishment.

(2) *Due to Financial Limitation.*—The unwise selection of foods may be due more to financial limitations than to lack of information. For example, the mother may know that the welfare of her baby depends upon its getting good milk, but certified milk, the best food for her baby, next to mother's milk, would cost fifteen cents a quart and she may not be able to afford that amount.

The young girl who is receiving a starvation wage of only six dollars a week and is trying to eke out that meagre sum to make it cover rent, clothing, board, laundry, carfare and postage on her letters home, finds that she cannot spend more than twenty-five cents a day for food if she is to dress respectably. That means that at least two of her meals must be cold lunches in her room and must be reduced to ten cents for the two meals, while her third meal, and the only square meal of the day, is a fifteen-cent one taken at a woman's lunch club down town. She knows that she is illy nourished and that she needs more eggs, vegetables and fruit if she is to keep her girlhood vigor and freshness of color, but the poor child simply hasn't the price, so she lives on crackers and cheese, dry bread and milk, good enough so far as it goes, but so lacking in variety that by the time she has had the same thing three or four hundred times she loses appetite and would rather go to bed without any supper in order to have a double portion of meat-stew at the club the next day.

(II) IMPROPER CARE OF FOODS.

(1) *Due to Lack of Knowledge.*—In a large proportion of the homes of wage-earners the improper care of foods may serve directly or indirectly as a menace to health. Partially used food may be left upon the kitchen table from one meal to the next, or if cleared from the table it may be carelessly tucked into a kitchen cupboard where fermentative processes or even putrefac-

tive processes may begin and get well under headway before the food is thrown away or consumed. The flies from back alleys and barns—or worse yet—from neighboring sick rooms, have free access to this food and may deposit a trail of disease germs upon it. The milk for the baby stands open on the kitchen table and may be equally contaminated, but the innocent defenseless child has no other food provided until the following day, though the bacterial count may mount into the millions during an August or September day and night.

All of these unfortunate things can happen in a family purely as a result of ignorance.

(2) *Due to Lack of Facilities.*—Even if the housewife knows better than to leave food exposed in this way to heat, desiccation and contamination, she may lack the facilities for proper care of it. She has no refrigerator and cannot keep her baby's milk cold; she has no screens for doors and windows and therefore cannot keep the flies out of the house; she has no stone jar or tin can for a bread box and therefore the bread dries or moulds. Women subjected to such domestic conditions are very likely to throw away unused portions of food because of lack of facilities. Waste, therefore, in such homes becomes a serious complicating factor. As a matter of fact, in many homes there is enough food wasted every six months to pay for a refrigerator and keep it stocked with ice; to pay for screens for windows and doors, and for other facilities necessary properly to care for the food, so that the half-loaf and half-roast could all be used up and not consigned to the garbage can.

(III) IMPROPER PREPARATION OF FOODS.

(1) *Due to Lack of Knowledge.*—Many a housewife, through lack of knowledge, fails properly to prepare foods and therefore may serve to her family nourishment which may carry a menace to their health, either in foods that are difficult of digestion, or in foods that may have become contaminated in the market or in the kitchen. Many of the foods are handled carelessly in the markets and are not protected from flies, either in the markets or in transit to the homes. Many of the foods therefore require

very careful washing in the kitchen before they are cooked. The bacteria of fermentation and putrefaction are killed by adequate cooking. It is also true that as a rule these bacteria are killed in the stomach by the hydrochloric acid of the gastric juice, but this latter is not always the case and occasionally an individual may be temporarily afflicted with hypochlorhydria. In such a case the ingestion of foods contaminated with these bacteria superadding them to those already inhabiting the alimentary tract may start and probably would start a furious bacterial activity in that tract that would seriously complicate the condition of the individual. In the preparation of foods every housewife should know the importance of properly cleansing the material before cooking, and then of properly cooking the material in question. Adequate knowledge will prevent waste of valuable materials. A quart of milk that may have become sour need not be thrown away and it ought not to be eaten without proper preparation. The efficient housewife neutralizes the acidity with cooking soda and uses the milk in any one of a hundred ways to make a wholesome dish for the evening meal. A delicious custard, for example, might be made that would be not only easily digested but wholesome and could afford nearly the whole meal for the younger children of the family, from one to five or seven years of age.

The dissemination of information among the home-makers of the wage-earning class regarding the selection, care and preparation of foods is a matter of the greatest importance and one which would contribute greatly to their well-being.

(2) *Due to Financial Limitations.*—A certain amount of the difficulty in the preparation of foods is due to fuel economy and inadequate cooking resulting therefrom. It is very common to see cereals that should be cooked an hour or more, cooked only five or ten minutes. This saves fuel, but what the stove fails to do the digestive organs must accomplish, namely, the breaking up of the starch grains and the digestion of the starch; the first part of this work should be accomplished in the preparation while the second alone is the proper work of the digestive system.

DRUGS.

(I) THE PATENT MEDICINE HABIT.

(1) *Due to Ignorance.*—A vast preponderance of the use of patent medicine is found among farmers and the wage-earning class of the big cities. A generation ago the use of patent medicines was more general, but as the decades go by, their use becomes more and more limited to those who are less instructed regarding the use of drugs, and who are more accessible to the advertiser. The cheap journals and weeklies are read freely by these people and they are strongly influenced by the advertisements which make up no small part of their printed matter. The vender of panaceas finds in the family of the wage-earning man the freest buyers of his nostrums. They read the printed matter on the label and the accompanying pamphlet with the same trustful credulity that they read the columns of the weekly county paper, so they continue to buy "sure cures" for rheumatism, neuralgia, dyspepsia, "liver troubles," "kidney troubles," "nervous troubles," etc.

Until the enactment of the food and drugs act, it was almost the universal custom of patent medicine makers to combine in their prescription besides an active drug—which might or might not have the desired action—a strong narcotic: alcohol, morphine, cocaine, chloral hydrate, etc. In reality it was the influence of the narcotic in these patent medicines that insured the more or less continued use of them once the "remedy" was tested.

In ignorance and false economy the wage-earner called the practitioner of medicine only in cases of desperate, acute and immediate need. Sub-acute and chronic conditions he attempted to treat at home through the help of these much vaunted remedies.

One of the most serious cases of hob-nailed liver that the writer has ever seen was a victim of Peruna in the days when Peruna contained at least 40 per cent. of alcohol; the case was that of a woman—a temperance worker of considerable prominence. She had taken Peruna for a number of years, in ever increasing doses; she was a chronic alcoholic; but due to her work for temperance, her symptoms were wholly misunderstood by her family and friends. She finally died of chronic alcoholism, yet no drop of

alcoholic beverage with the exception of Peruna ever passed her lips. Post-mortem examination revealed the real cause of her death, which had been obscure and which had puzzled the medical staff of one of our largest hospitals in which she spent the last few days of her life. This was a plain case of ignorance which led to the patent medicine habit being established in the first place and continued to the end.

(2) *Due to Example.*—Many a patent medicine victim falls into the habit through the example or advice of a neighbor. It is quite probable that this accounts for the beginning of the habit in a majority of the cases. The kind of a man who takes Smith's vinegar bitters for his stomach or Jones' sarsaparilla for his blood, is the kind of a man who talks to his neighbors about his ailments, describing his symptoms in detail. The ignorant young neighbor who has not yet acquired any series of symptoms peculiarly his own, listens with bated breath to the recountal of his old, experienced neighbor. He shows interest in the case and the "cure." His old neighbor gets the pamphlet that came with the "remedy." The young man takes it home and reads it, and as he reads he fancies that he himself has noticed those same symptoms. He has noticed that he experiences a loss of appetite after each meal; that he experiences a disinclination to get up in the morning and various other ominous symptoms, so he tries his first bottle. The chances are that it is the first of a dozen bottles—is the beginning of a lifetime habit of doping himself and his family.

(II) DRUG AND DRINK ADDICTIONS.

(1) *Caused by Example.*—The influence of example in starting the patent medicine habit has just been set forth. In no small proportion of the cases the patent medicine habit in general is the forerunner of and the cause of a special drug addition that may really ruin the life of the individual. This is particularly the case when medicine that contains morphin, cocain or chloral has been used. The victim finds out that the particular constituent of the remedy which has the sought-for quieting effect and makes him oblivious to his troubles both physical and mental,

is a substance which he can buy separately at the drug store, so he begins his downward course as a morphin or cocain fiend, using all sorts of devices to get the drug from the "honest druggist."

(2) *Caused by Patent Medicine Habit.*—Patent medicines which contain twenty-five per cent. or more of alcohol are very likely to cause the victim to become eventually a chronic alcoholic, if he discovers that the constituent whose special action he craves is alcohol.

(3) *Caused by Physician's Prescription Misused.*—Many a case of drug addiction, yes of drink addiction too, has been caused by the misuse of a physician's prescription. There are certain aggravated acute cases where the physician prescribes morphin or brandy to alleviate the condition with no thought that he may be handing to his patient a dangerous weapon, which the patient may later use suicidally, tho without suicidal intent. While the prescription is left at the drug store the patient has the number of the prescription on the box or bottle and returns repeatedly to have it refilled; this may go on for a month or a year. He may get a copy of the prescription from the druggist and move to some other city or state and continue to have this prescription refilled to the end of the chapter. Years after the physician has forgotten the patient, his prescription is being refilled by a druggist a thousand miles away. The victim of the drug addiction may have had his life ruined. Physicians are in these days conscientiously careful not to give prescriptions that contain any appreciable amount of narcotic. If it is necessary to administer a narcotic drug in an aggravated or acute case the physician administers it personally or directs the nurse to do so and the patient does not know what he receives and if he should later ask what it was that gave him such complete relief, he is given an evasive answer. The writer personally knows of a case where a cocain solution was used to allay irritation in the nasal mucous membrane. The patient was given a prescription. He used the douche in considerable excess, was keen enough to know that it was the cocain in it which caused his pleasurable sensations, and began the use of the drug as a confirmed cocain fiend. Too much care

cannot be exercised by practitioners in the use of narcotics. No prescription for morphin or cocain should ever be put into the hands of the patient. If the case is sufficiently serious to require these drugs the physician or nurse should personally administer them and under no conditions should the patient be told what he is getting.

(4) *Caused by Food Accessories.*—(a) *Tea and Coffee Addiction:* While tea and coffee in moderate strength may be used a lifetime in moderation by most people, it sometimes happens that an individual of nervous temperament discovers that these beverages afford a noticeable stimulation which is pleasing and which they convince themselves to be actually advantageous. While occasional caffein stimulation may be advantageous, frequent extreme caffein stimulation is distinctly disadvantageous, but the victim of the caffein habit step by step gets drawn deeper into the mire of addiction until he becomes a real tea or coffee fiend. The writer has known women who had tea for breakfast, dinner and supper, two or three cups at each meal; and then finally reached the point of resorting to tea in the afternoon or evening to keep them awake and to keep them going. The writer has known men and women so addicted to coffee that they used from ten to fifteen cups of strong coffee a day, thus almost continuously whipping their tired nerves with the caffein lash. Such gross excess in the use of tea or coffee must be classified among the drug addictions, and while they are not by any means so serious as morphin, cocain or alcohol addictions, they are nevertheless sufficiently serious to merit attention in this connection. The excessive use of these stimulants seriously menaces the general health and well-being. Information regarding this menace should be accessible not alone to the wage-earner in factory and shop, but to office employees and those who are domiciled in mansions on the boulevard.

(b) *Beer, Ale and Wine Addiction:* Most works on dietetics classify beer, ale and wine among the food accessories. There is practically no actual food value in any of these drinks and nobody drinks them with a view of receiving food value with the possible exception of the man who has been taught as stated above that

"beer is liquid bread." It is even doubtful if he actually believes it, though he may cite that in his argument of justification for its use. It is the influence of the four to seven or ten per cent. of alcohol in the beer that leads the man into the habit of making it a regular part of his meals, especially his mid-day lunch and perhaps of his supper.

Wine is used as a food accessory almost universally in southern Europe, where it is produced in great abundance. Until recent times its use found some justification in the fact that many of the cities of southern Europe had very adequate supply of very questionable water—water contaminated in its source, in its transmission and in its final distribution. The people feared to drink the water, properly too, and they recognized in wine a safer drink than water presented at certain times. In order to make sure they used wine all the time. In fact they had no way of telling when their water was fit to drink.

But this fear of the water of the cities of southern Europe is no longer justified. The writer has used this water freely for drinking purposes in many of the cities of southern Europe, after first ascertaining that all the laws of modern hygiene are carefully observed in the collecting, transmission and distribution of the water supply. The tables are now turned on the wine. Water is a wholesome natural drink and we know wine to be an unwholesome and unnatural drink. There is a gradual awakening of the governments of Europe to this fact. It is probable that within the next generation beer, ale and wine will cease to be classified as food accessories. They will be classified as harmful drinks and their use will be very much restricted.

(5) *Due to Desire for "Stimulation" or Narcosis.*—Many a wage-earner begins the use of strong drink because of his desire for what he calls a "stimulant." He feels tired, he may even be aching with fatigue. He believes that a "stimulant" will help him get through the day. A dram of whiskey or brandy eases his pain and makes him unconscious of fatigue, so he continues his day's work convinced that his dram of alcohol helped him with his work affording a needed stimulus. In the light of modern researches we interpret his response to the alcohol very differ-

ently. It did not stimulate him, it only relieved his sense of fatigue and pain as an anesthetic does. Instead of being a stimulant it was really a narcotic. Relieved of the pain and the sense of fatigue he continued his work to the end of the day only to feel a recurrence of his fatigue all the more extreme as the reaction sets in. The argument which he used to justify the first dram may be used again to justify a second dram, so he drinks again to forget his weariness. It is hardly necessary to say that a man who starts on that sort of a campaign soon degenerates into the class of inefficient workers. Among the men laid off from the factory he is in the first lot if he is a man without a family. If he has a family to support, the manager will keep him until he becomes an actual loss to the company in inefficiency and cost. The family man who is an addict of alcoholic beverages will probably be in a second list of those who are dropped from the payroll. In this seeking of a "stimulant" lies one of the most serious menaces to the wage-earner so far as concerns his relation to drugs. Every effort should be made to disseminate among wage-earners a knowledge of the truth regarding alcohol. Every wage-earner in the world should be taught that alcohol in any form as beverage, food accessory, or medicine is a narcotic and not a stimulant, that it is a dangerous drug because its moderate use is likely to lead to its excessive use and that its excessive use is associated in a casual relation to weakness, disease, degeneration and death.

(6) *Due to Desire for Conviviality and Good Fellowship.*—Many a man who feels no need of "stimulation" does feel the need for companionship, good fellowship and conviviality. Furthermore, he has a right to these things. Man is a social animal whose highest all-round development cannot be attained in solitude. He needs companionship to bring out his best qualities. Considering all of this, it is easy to understand how the man who has just received his week-end pay envelope goes with his companions and associates into a neighboring saloon where their pay checks are cashed and he sits there for an hour or so relaxing from his week's work, telling jokes and funny stories and incidentally setting up the drinks for the half dozen men who sit about the table in the alcove. It has become customary in America for each of the other

men in their circle to set up the drinks for the crowd. This is a most unfortunate thing, because if there are six men in the group and if each man sets up the drinks, each one will have had six drinks before their little social gathering is broken up, but six drinks exceeds all bounds of moderation—it is excessive. The man goes home at eight or nine o'clock instead of six or seven, distinctly under the influence of intoxicants and with an appreciably depleted purse. It is hardly necessary to further depict the almost certain downward course of this wage-earner. Drug addiction in his case becomes chronic alcoholism. He gradually, as the years go by, degenerates first into an inefficient worker, in time of a dull season he is first to be laid off, and finally becomes a continuous member of the great army of the unemployed. His wife and children are now the bread winners for the family while the drink addict, who at forty-five or fifty, should be at the climax of his industrial efficiency, because he should now work only not with trained hands but also with ripe experience and judgment—mopes and smokes and growls at home, his own health wrecked and the health, happiness, education and general well-being of his children seriously menaced if not actually impaired.

XI

HOME SURROUNDINGS.

By THOMAS D. DAVIS, M.D., Ph.D., Pittsburgh.

An ideal home is one where the physical, mental and moral welfare of the family is developed in the best, or highest, manner possible. Such a home in the apartment houses of a modern city is an impossibility. For while extreme care might develop the mental, and to some extent the moral natures, in such apartments, yet the physical strength would have to depend almost entirely upon outside influences. Even if properly prepared food is supplied, fresh air, sunlight and proper heating are to a great extent wanting. If this statement is true of the most palatial apartments, how much more serious is the condition in those apartments designed to house the most people in the smallest space possible? This deficiency is not only true concerning physical needs, but the more contracted the space the less chance there is for mental and moral uplift. Take music, which everywhere is recognized as elevating; its practice is forbidden in many apartments, while the lack of privacy is far from conducive to good morals. It is not the children alone who are thus deprived of the benefits of ideal housing, but the parents also.

Child nature demands relaxation and exercise, but where and how are city children to get it? Few city homes have yards, or is there vacant ground where they can play, while usually it is a long distance to the parks, even if they have no keep-off-the-grass signs in them. The streets are dangerous for play and the time-honored hop-scotch is forbidden on the sidewalks. No longer may children play I-Spy or Hunt the Hare in the streets nor ride bicycles or use roller skates on the sidewalks; the policemen watch that the rights of our citizens are maintained. More than one boy fourteen years old, out on our Juvenile Court Farm, has said to me: "Until I came here I never threw a stone as far as I wanted to, nor *hollered* as loud as I could!" To meet this absolute need of play some cities in their great generosity have provided small grounds. They have usually located these where

property could be bought the cheapest, rather than considering where they would be the most convenient for the children. Not only are the best of these grounds inadequate, but in our wisdom we have tried to teach children "organized play:" This is a series of trivial games, or drills, that to all intents is a system of work, devoid of most of the elements of real play! At stated periods exhibitions of these drills are given and the delighted public vociferously applaud, while the paid conductors exclaim: "See how beautifully we have taught your children to play!" Last year our city paid \$57,000 to teach our children how to play.

On the other hand, a perfect house and grounds may not contain a true home. We are so given to charging every shortcoming to environment that we are prone to overlook the personal equation. Where among the poorer classes bad parental oversight may be charged to ignorance, too often in the home of luxury it is the result of indifference, or neglect. Children of the wealthy are frequently brought up more by servants than by their parents, and thus moral, mental and physical bad habits are the result. Even where parents have the interest of their children at heart, they sometimes are so engrossed in business and social cares, or have so little aptitude for such delicate and important work that their oversight is imperfect if not disastrous. The incorrigible and degenerates are not all from the homes of poverty. Many of our most distinguished and honored citizens have come from very humble houses. It is the aspiring mind and loving heart within a building that elevates it into a home. Indeed it would seem as if discouraging environments only stimulated ambition in some. Andrew Carnegie was brought up in a very humble house, but there was a faithful Scotch mother in it that made it a true home. Lincoln's early house had but three sides, but a devoted stepmother made it a home. Garfield's dwelling was of the humblest sort, but his Christian mother made it an exalted home. Has not too much effort been expended on mere inert materials that make houses, rather than on pliable minds and hearts that make a home? The great Park Hotel in New York was once A. T. Stewart's unsuccessful home for working woman! Mere improvement of houses without extra

efforts to improve their inmates, in the long run, have been failures. Much thought and money have been expended on hygienic housing propositions. It has always been an attractive field for philanthropists, but it has invariably been found that it is easier to supply suitable houses than it is to find suitable inhabitants for them.

I have recently been through a large section of the bituminous coal fields. At the great majority of the works there are no more comfortable, or sanitary houses for laborers in the world. These houses are separated from each other and have an abundance of light and air. Most of them have front yards and garden room in the rear. They are usually of two stories and have modern sanitary appliances, as far as possible, yet many, very many, of these look more as if they were cattle pens than homes for human beings. As a rule their front yards are entirely neglected and not a vegetable is raised in their gardens. This is all the more marked because immediately adjoining may be houses with flowers and shrubbery in their front yards and profitable gardens with their attractive foliage and growth. Mostly, however, unkempt women and loafing men are lolling around in front with pigs, chickens and children. The beer wagon stops oftener at these latter houses than does the milk cart. The Sundays and holidays of the men are mostly spent with beer kegs in the woods or along the rivers, sometimes accompanied by their women and children. Their houses are not homes and present no attractions for them, yet these men receive the highest pay in the world, for the same kind of work. One of our largest employers of labor told me recently, that when their men went wrong they invariably traced it to miserable housekeeping and slovenly women. The floors of some of these houses are not scrubbed for months and they swarm with vermin. Nor is it ignorance alone of good housekeeping that leads to such foul conditions. I know several women who were neat and tidy domestics in fine homes, who are now married to good tradesmen, but their dwellings are now indescribably dirty and disorderly and their children the very worst in their neighborhood. I have known neat, clean and convenient houses, just new, that in a few months were too

filthy and unhygienic to be described. The cause of this retrograding is mostly beer, or the depressing influence and discouragement of strikes.

Much of the crowding in the more respectable tenements is entirely unnecessary, and is more the result of cupidity than poverty. In the poorer districts I have known laborers getting \$2.25 a day, who slept in cellars, five to ten in one room, costing them fifty cents a week, and they were simply saving up to get back and loaf in dear, dirty old Italy. The Huns in our coke regions are notoriously degraded. The condition of some of their sick and injured when they are brought to our city hospitals is simply horrible beyond belief, yet their company houses are almost invariably well built, comfortable and convenient. A pen of hogs, no matter how fine the building may be, is still a hog pen.

With such parents, who create such surroundings, how is it possible for their children to advance? Take these same children out in our Juvenile Court farm, where in simple cottages they have been trained by faithful house fathers and mothers, and their rapid improvement, in every way, is simply wonderful, but these same simple cottages without the skilled and devoted foster parents and teachers would accomplish but little of a permanent value. Unless such children can be separated from their parents there is but little hope for them. Simply improving dwellings is trying to purify the foul stream when the trouble is at the source. Purify the people and the dwellings will become pure.

I recognize fully the crowded condition and the miserable accommodations in the tenement houses of our cities, but even in them cleanliness is not altogether impossible if the people are clean. The very worst tenements are made worse because the tenants are slovenly and lazy. There can be no doubt that more disease is caused by the way a house is kept than by the house itself, no matter how poor it may be. Only those whose duties call them into our worst tenements can realize how unsanitary, not to say filthy, they are kept. There is often poverty in everything but dirt. Even in a grade better apartments there is a woeful lack of cleanliness. It is the habit of many in these

to *clean up* once a week and the rest of the time the house is in disorder, confusion and dirt. The waste in most of these houses, either through ignorance or indifference, is appalling, while poorly cooked food is the constant source of physical evil. Our schools have, with the expenditure of much money and time, attempted to overcome this, by teaching culinary art to children from such homes. It has not been a real success. Domestic science kitchens have been fitted out with appliances never dreamed of in tenements. This equipment consists of glass topped tables, marble sinks, tile tops, refrigerators, fine cooking utensils, gas stoves with broilers, toasters, etc. While the dishes they are taught to prepare are to a great extent an impossibility in tenements, the same holds true of similar work in most social centers. It would seem as if public kitchens should prove successful, where food would be prepared more economically and certainly far better than it can possibly be done in most tenements.

Let us have as good houses as we possibly can. Let us supply every convenience and sanitary device possible. Let nothing be undone to give everyone the best environments possible, yet after all we will find that it is the people that we must improve rather than their houses alone.

XII

IMPROPER RECREATIONS.

By **SHERMAN C. KINGSLEY**, Chicago, Director **Elizabeth McCormick Memorial Fund**;
Former Superintendent United Charities of Chicago.

Man's earlier occupations were out of doors. He ranged the forests, tilled the fields and sailed the seas. He indulged in the chase, and both his labors and his recreations, which were often akin, were largely in the open.

With the coming of factory conditions and city life, a great change has taken place. The ranch and the farm gave way to the cottage and the yard, and these, in turn, yielded to the flat and the tenement which covered the whole block. The retreat from the open is well nigh complete. The tenement surrounds the factory. A short walk in the early morning hours and late at night takes the worker to and from his dwelling and the factory where he labors at a desk, a machine, at more and more specialized kinds of work. He carries his lunch with him, and this is often eaten inside the building. This operation, repeated day in and day out, describes the orbit of his life. The dwelling is on one floor and consists of from one to four or five rooms, averaging about four for the usual worker. Land becomes valuable in these congested places and it fills up. No account is taken of out-of-door opportunities; the worker will not stay in his three or four rooms, and seeks some kind of recreation from his circumscribed and monotonous life.

Since the worker either has not been able himself to look out for his opportunities for recreation, or has not had the foresight to do it, and since society has not done it, this field of activity, like the recreation of children, has been appropriated and commercialized by a group of people who are wise in their generation. They know that not only will children not remain in these two or three or four rooms, but that neither will the father. Consequently, the saloon, the dance hall, the pool room, the gambling house, the cheap theater and other sorts of commercialized amusement have sprung into existence and cater to the "street

and alley time" of boys and girls and the off work hours of the men.

In the city of Chicago there are 7,000 saloons. Often every building on the whole side of a block is a saloon. 7,000 saloons in the city means one saloon for every 70 adults. About the same proportion prevails in other large municipalities. So, the worker having spent his 8-, 10-, 12-hour day in the factory, with brief intervals at home for his morning and evening meal, finds himself, with companions, in some one or other of these indoor places of recreation. The saloon still counts the largest numbers.

After an evening thus passively spent, often with the accompaniment of intoxicating drinks, with low-tone scenes, stories and other amusements, usually in close and vitiated atmosphere, the worker returns to his home to spend his sleeping hours also in congested quarters.

The Juvenile Protective Association of Chicago, in a study of the recreations of young people about a year ago, found that on an average of about 80,000 young people a night were to be found in the dance halls, largely connected with saloons, in the city of Chicago.

Some measure of the moral perils connected with this kind of recreation is indicated in the number of arrests, of the convictions in courts, and of the recruiting that goes on in the red light districts. There is probably no data on which to base any estimate of the lack of efficiency and physical deterioration occasioned by these false standards of recreation.

One of the things strikingly impressed upon social workers when they come into intimate and confidential relations with our immigrant population is the distress they experience in trying to bring up their children under the new conditions.

The majority of them are accustomed to greater out-of-door activities in the lands from which they come. The folk songs, games and dances, the times enjoyed by the family together, are among the charms of life not only in Italy, but in France, Germany, Sweden, and other countries as well. There, it is more the custom for the whole family to have their good times

together. Here, the special places for the men in the way of saloons and other forms of so-called recreation, and those that appeal particularly to the children, help to break the family up and progressively to instal disintegrating, specialized forms of diversion.

This makes the matter of present form of amusement of double consequence. It has its immediate effect on those who are participating in the different kinds of recreation, and it is also making habit and tradition which will descend to the children. It is bad enough to register the consequences of recreation on wrong lines in the bodies of those who participate in and make a habit of that kind of recreation. It decreases efficiency, lowers the tone, and is a losing game for those who practise it. It is at the same time insidiously confirming in the minds and practices of people acquiescence in and a demand for that particular form of city life. It is a distinct loss to any community to have it instilled in the minds of its growing children that it is an intrinsic part of a city to have saloons and brothels, arrests, disorderly houses, and a whole line of low-tone, destructive, so-called recreation agencies.

One of the most hopeful developments that has taken place in our modern life is the bringing back to the people of open spaces, of swimming pools, field houses, playgrounds, recreation facilities of a wholesome sort.

As city life is organized to-day, the working man is unable to provide proper recreation for himself and for his children. It must be a community affair. Together the people must plan and make provision for this matter of recreation.

I once heard a man say that he felt it almost more important to know what the young men in his employ did outside their working hours than what they did while employed.

By the very weight of present adjustments, the temptation is placed on the average working man to make a wrong use of his recreation moments. Some of the most cheering sights that one sees in England are the bowling greens, the cricket fields and other places of recreation scattered about the cities, and to see the working people after hours spending the long twilight in some

form of delightful out-of-door recreation. Great use, also, is made of vacant spaces—allotments, they are called—along railroad tracks. Indeed, all the land about the cities is parceled out to those who wish to use it for flower and vegetable gardens; and as one travels about one sees hundreds of people—men, women and children—employed in this way during their leisure moments.

In the parks about Paris one will see whole families, father, mother, children, the grandfather and the grandmother, all playing together, or with employments and recreations suitable to each group.

In Germany, the average working man loves to spend his Sunday in the open air. In the large cities they start early in the morning with their whole family, even the babies. They take their dinner, the children their playthings, the mother some needlework. By train or trolley they reach some place in the country and settle under a tree in the meadow, on the bank of a river, at any place they like, for the day. In the smaller places where the open country can be reached more easily, they sometimes prefer having an early dinner at home, but the afternoon is spent out in the open.

Around nearly all the large German cities are so-called garden colonies. A big area is divided into small lots that are left for garden purposes. The single lots are sometimes only about 16 to 33 feet, but the tract contains a little cottage or arbor, a small lawn and heap of sand as a playground for the youngsters; and in these places an abundance of flowers and vegetables are raised. Many working people seize this opportunity to have a bit of land of their own. These garden colonies are accessible, and every free hour on Sundays and holidays is spent there.

This observation has been made by a German social worker: "There is no sport that might be called the National German sport. It is perhaps due to this fact that Germany does not suffer so much as other nations do from the dissolution of the family. Until now, the recreation opportunities for the working people helped to draw the family together, and one thing that has re-

tarded the more formal organization and specialization of sport is that it would tend to separate the family." Walking, bicycling, hill climbing, swimming, rowing, all are very popular in the countries abroad. They have paid greater attention to the care of streams and of water resources than has been the case in this country.

In England the Half Holiday Association is an indication of the value that is placed on recreational facilities. This Association has equipped country houses and places that make a nice destination for a half day's walk or bicycle ride. Here, somebody is in attendance to act as host, and the fine old English places receive the people who are on the walk or the ride and provide meals or accommodation for the night.

What we want in this country is to create an appetite for the open air, for wholesome recreations, a love for trees and grass and flowers—for God's great out-of-doors. It is becoming more difficult to get such things, but out-of-doors is a big place. There is an abundance of fresh air and of sunshine. These things can be made available for almost every man, woman and child, if only the community appreciates the necessity for such things. We need them and must have them.

We want to stop this tendency of instilling in the minds of our growing children that saloons, dance halls, passive recreations, are the right kind of thing. Vicarious exercise will save no one. It is not sufficient to sit around a prize ring or on baseball bleachers, on benches in stuffy moving picture shows, and watch somebody else in action. The individual must move his own muscles, must bathe his own lungs in fresh air, must let the sunshine do its work on its own face and arms. We want to give the out-of-doors back to the people. We want each individual to have the right kind of facilities, to acquire right tastes and habits in recreation, and to hand down to his children the right kind of traditions in recreation. It is a great thing for a nation to have the right kind of songs. Is it not fully as important that our recreation and play should be upbuilding, helpful, satisfying and ennobling?

XIII

DISCUSSION

Dr. L. Duncan Bulkley, New York City:

I think we cannot thank Dr. Hoffman enough for bringing to us this interesting paper upon the local cause of cancer. Those of us who are studying the disease will recognize, I think, that it is suggestive in regard to the action of light. Cancer is an aberrant cell in the human body. It just so happens that I am to read a paper on cancer in the Pathological Section of the American Medical Association, so I happen to be pretty full of this subject. We find that the Cohnheim theory of "embryonic rests" is probably true; that these rests are in every one; that they remain unproductive for a great number of years and then take on this aberrant action. Cancer is only the ultimate result of something that has gone wrong before. It is not a disease coming from the outside, not infectious, not contagious, but simply the starting up of some cells which then take on this morbid action. What is the fundamental cause of it? The meat-eating of England has increased of late years so that now there are some 130 lbs. of meat consumed in England for each man, woman and child per year. Among the higher classes from 180 to 230 lbs. of meat are consumed in addition to game, fish, eggs, etc. This is more than double the amount in fifty years. During that period of fifty years cancer has increased four-fold, and one cannot help believing that there is some relation between the two facts. In New York, cancer has not greatly increased in the last five years. I explained in my paper that this was probably due to so many of our immigrants living upon their former food of a vegetarian character. In Baltimore, where there is not the immigrant class, cancer has increased 11 per hundred thousand. In seven of our large cities cancer has increased seven per cent in the last five years. In the cities presenting this increase there has been the increase in meat eating and coffee drinking. I think it is a mistake to look wholly to local causes.

Mr. Lewis T. Bryant, Trenton, N. J.:

I should like to ask Dr. Hoffman whether any precautionary measures are being taken in England, or whether they have devised any remedial features to offset the inception of cancer?

Dr. F. L. Hoffman, Newark, N. J.:

Persistent efforts have been made to improve conditions in the pitch and tar, or artificial fuel briquetting industries, but the results have not been entirely satisfactory. In the main, reliance is placed upon absolute cleanliness, and it is held that the immediate removal of the irritating dust would be, as a rule, effective. The subsidiary and more elaborate and costly legal protective requirements were, on the whole, found to be the least useful. The principal difficulty was experienced in securing the cooperation of the men who objected to the compulsory bathing and washing requirements.

Mr. Bryant:

What particular type of dust would be calculated to induce cancer?

Dr. Hoffman:

The dust of the pitch.

Mr. Bryant:

Was not the cancerous effect rather due to contact of the dust with the skin than from the breathing of it?

Dr. Hoffman:

The cancerous effects were due chiefly to the contact of the dust with the skin and the resulting irritation. The settling of the dust in the sweating pores of the body was held to be the direct causative factor.

Mr. H. W. Jordan, Syracuse:

We had an operation which ground pitch very fine. Some of the men were greatly irritated by this fine dust, particularly in warm weather. It had a penetrating effect, and with the perspiration seemed to go right into the skin. This might produce more cancer than ordinary dust. While some men were quite immune, others were not able to work until provision was made to prevent the dust in the room.

Mr. Bryant:

In regard to the second paper, it is surprising how general is the use of lead in several industries in most of the States of this country. Perhaps the United States has been more derelict in the matter of protection than any other country in the world. Workers where lead is used in quantities by inhaling the dust have their vitality so impaired that they are likely to contract other diseases than direct lead poisoning. Dr. Hamilton, who is probably the greatest investigator, aroused the several State Departments to do something along the line of remedial work. In our own State we found from the records of one physician that in the city smelter works there were 200 cases of lead poisoning varying from the usual symptoms of lead poisoning down to the double wrist drop and total paralysis.

Dr. C. T. Graham-Rogers, New York City:

One phase of the subject of lead poisoning is laxity of laws regarding the house painters. We find that many cases are due to faulty personal hygiene. If there is lack of facilities for proper washing, the workman will not take care of himself. In the erection of new buildings there is no provision made for the painter to wash up, and the best he can do, perhaps, after the work is finished is to use a piece of waste or paper for wiping his hands. There is no hot water and no soap for his use. I remember one instance in which rigid requirements of the law were complied with but in which case after case

of lead poisoning develop. Here I found that there was litharge in the water tank. Physicians are not working hard enough to prevent lead poisoning in not reporting cases and not learning to recognize lead poisoning. When a case comes to a physician the trouble is not taken to inquire into the nature of the work of the patient. A large number of cases are being treated as anemias. I appeal to the physicians to further the reporting of lead poisoning. It is only upon our morbidity statistics, not our mortality statistics, that we can accomplish results. Let us help the people now while they are alive and not wait until they are dead.

Mr. Bryant:

Dr. Rogers spoke of the value of reporting cases of lead poisoning. I do not think the general practitioner appreciates what a help that would be to the official in charge of the State Department. If we could back up our argument by showing the number of cases of lead poisoning occurring under these circumstances we have the best means of securing improved conditions. I should like to ask Dr. Rogers in regard to machinery hazard, what standard of air movement they require for furnaces?

Dr. Rogers:

We have not set any specific standard. We take each case on its merits. Our mechanical engineer is trying to look up standards, but finds it a difficult matter. We have in a way tried out the matter upon illuminating gas, but even that is difficult on different machines.

Mr. Bryant:

Mr. Roach mentioned the old type of hood. This was placed about the face of the man so that the exhaust of noxious fumes would be taken right past the man's face. In this way the very thing that the effort was made to avoid was brought about. We have made quite a number of experiments. One is to have a duct run down from the height of the man, and having a hole in the back of the hood so that the fumes are drawn away from the man, down and up, and thus avoiding his contact with them.

Dr. Rogers:

Upon that point we have set this as a rule—that the dust, fumes, gas or vapor must be removed *away* from the worker, and directly at the point of origin. There must be a standard of 1,000 ft. of air per minute.

Dr. Helen C. Putnam, Providence:

Do you test the standard of 1,000 ft. of air per minute with an anemometer?

Dr. Rogers:

We do.

Mr. Bryant:

The question of child labor has been pretty thoroly discust in all parts of the country. The Child Labor Committee has done splendid work and has prepared a uniform Child Labor Bill which is adopted with considerable modifications in some parts of the country. We adopted in our State a bill limiting the hours of labor for minors under 14 years to not more than eight hours a day and not more than 48 hours a week. We specify, in particular the occupational industries which would be harmful. We submitted the bill to Mr. Lovejoy after we had prepared it. He was much pleased with it and will probably make further use of it.

Dr. Edward Jackson, Denver:

Mr. Lovejoy sent with his paper a preamble and series of resolutions. (Dr. Jackson read the resolutions and they were referred to Council under the standing rule. They were subsequently reported back from Council and as adopted by the Academy are as follows:)

WHEREAS, many thousands of children under sixteen years of age are employed in the United States in gainful occupations under improper conditions, resulting in the impairment of their health and future well-being, as demonstrated in the recent investigation made by the Federal Government, which shows that 37 per cent of the deaths among cotton mill operatives in three New England cities and 41 per cent in three southern cities were due to tuberculosis in the three-year period 1905-1907; and

WHEREAS, nineteen states and the District of Columbia have already enacted laws limiting the hours of labor for children under sixteen years of age to eight per day and prohibiting such children from working at night or at dangerous occupations; now, therefore, be it

Resolved by the American Academy of Medicine that we commend those states which have adopted legislation to protect children under sixteen years of age from the disastrous consequences of unsuitable work and bad industrial conditions, and urge all other states to establish for the benefit of such children the eight-hour work day and the prohibition of labor at night, or in any hazardous employments, and to this end we recommend that the medical profession generally advocate the passage of such laws by the legislatures of their respectiv states.

Mr. Bryant:

One of the most serious features of the industrial problem for the working of women, in addition to the long hours, is the matter of providing seats for women when possible. This is sometimes a difficult thing to accomplish in certain types of industries. All know the anatomy of woman and that such long continued standing is very injurious. I think legislation should be directed along the line of providing seating for women. In our own State we are trying to secure this in factories. There are many things at which

women can work as well sitting down as standing. I understand that women working upon lead are affected in their child-bearing qualities. I have heard that in some of the industries in our State in which lead is encountered, of the women engaged in the work very few are capable of bearing normal children. Another thing which should receive the attention of the legislatures of this country is some restriction about the employment of women for a certain time before child-bearing and concerning their return to work afterward.

Dr. Rogers:

I would like to call attention to the fact that whereas we hear a great deal of the effects of wood alcohol, the use of this alcohol is not so great in industries as one would be led to suppose, nor are the results so dangerous as we are led to believe. There is, however, in use the amylic alcohol, the dangers from which are more grave than from wood. The effect is just the same as from the wood alcohol and it is used to a much further degree. I have seen girls working in the industries where it is used practically intoxicated. Attention of physicians should be brought to this matter.

Dr. John L. Heffron, Syracuse:

The superintendent of a large steel plant in our city told me that nearly all of the accidents that occur in that plant take place as the result of fatigue in the latter part of the afternoon, and that on Monday, after the "fatigue" of Saturday and Sunday, the accidents are particularly numerous.

Mr. Bryant:

The remarks of Dr. Heffron emphasize the matter of improper recreation on Saturdays and Sundays and has some bearing upon the question of improper lighting. In most industries a large number of accidents occurring toward evening, which may be occasioned somewhat by the natural fatigue and loss of vitality of the operative after working long hours often in badly ventilated work rooms, are in part due to improper lighting. Too much attention can not be placed upon the matter of properly lighted rooms and the direction of the light that the person at the machine may readily see the needle. Passing thru Newark recently, I saw in a factory the upper portion of the building used by the officials, good lighting, well shaded, while immediately underneath, men and women were working upon machines with unguarded lights and the light thrown into the eyes and not upon the work. I think this would not only have an injurious effect upon the eyesight but also cause headache and detract from the efficiency of the workmen.

In regard to Mr. Roach's paper, it is difficult to cover in a comprehensive manner the question of stagnant air. In the room which has no movement of air, even tho there be sufficient cubic air space, the air is perfectly dead is quite as injurious as that in a room where there is less air and there is some movement of it.

Mr. Jordan:

In certain industries in which steam and acid vapors are to be disposed of, means have been introduced for bringing the heated air in, not only along the walls, but down the posts, discharging it at 4 feet above the floor. The heated air coming down increases the temperature, carries off the steam and gives fresh air at the level of the workers' heads. In this manner the heated air duplicates the conditions of summer air. This is a better method for ventilation than by suction.

Dr. Putnam:

I should like to ask Mr. Jordan whether any record is kept, or examination made daily with regard to the temperature and humidity of the air.

Mr. Jordan:

We have done some work in keeping records of the temperature and humidity of the air. In general, our buildings, which are high and open, insure constant motion in the air. The humidity ranges from 60 per cent. to 70 per cent.

Dr. Rogers:

The State Department of Labor of New York has done some work on ventilation. From 1907 to the present date, each year has been published the Report of the Commissioner and in this will be found the results of air tests made in different types of factories; also descriptions of apparatus devised for making various tests. Those interested will find the data of such work in these reports.

XIV.

MEDICAL INSPECTION OF THE INDUSTRIES—NATIONAL, STATE, MUNICIPAL OR PRIVATE.

By **RAY LYMAN WILBUR, A.M., M.D.**, Dean, Stanford University Medical School, San Francisco.

Medical inspection is a purely human phenomenon; it has no nature-made laws controlling it, so that it offers an opportunity for the intellect of man to choose certain methods which will be feasible under existing social rules, constitutional, legislative and judicial, to bring about certain definite results. To be effective, it requires inspectors who are experts, who know what is to be accomplished and who are impartial and fair and practical. If we were planning for a new commonwealth interested in seeing that human industry did not exact more than the minimum of maimed and dead bodies, our task would be difficult, but to devise a method that will not conflict with the thousands of factors concerned, industrial and governmental, is at present impossible. The division of the United States into nearly half a hundred large units each one making its own laws concerning many subjects that could best be handled by the national government complicates the problem greatly. The state is no more of a proper unit for most industrial legislation, especially where products destined for interstate commerce are concerned, than it is for the making of the laws of divorce and of medical practice. A national bureau of health could render service in spite of the hampering influence of state laws were it created. But it could not be what it should be, creative and responsible. At the best then, we can only discuss those things that are possible at the present time. Evidently the practical ideal is to have private medical care and inspection of each industrial plant controlled by local or municipal inspectors with the authority to put their recommendations into effect, state inspectors to study the problems widely and to make suggestions that can have legislative backing enough to be effective and over all a national bureau giving advice, studying methods, training workers, and with a

limited authority to see that the broader federal laws are enforced. The whole scheme is full of weakness and pitfalls and only a wide-awake interest in the subject can make it even passably good. Fortunately, the combined conscience of society is stirring, the dollar is tottering on its glittering pedestal, and many things are now being measured in other terms than financial profit and loss. The compensation acts show that industry must bear the burden of its Moloch-like existence. It is beginning to pay to protect the worker from harm; the by-products of leg and arms and tombstones is becoming less necessary and less productive. The best way to save money is not to spend it; the best way to pay the working man and make him pay is to keep him clean, free from disease and foul surroundings and happy. Society is tired of having its progress stopped by the unnecessary cripples, the blind, the paralyzed, the widow and the orphan. Rat traps ought not to be made at the cost of human life, the washing of towels should not cost us human arms, and we should make dishes and manufacture paint without paralysis or fatal kidney disease as the price. Some factories have found these things out and they are making private inspection pay. The private inspector can be the family physician of the industry, he can watch over the health of its workers and when properly supported can organize an emergency hospital service, make regular examinations and forestall disease and injury. With full knowledge of local conditions and sympathy with the work a trained man can do great good. War, as well as industry, has taught us that the first care given the injured is the most important. The factory needs the private inspector and he needs the influence and the supervision of the trained impartial governmental inspector over him. In Germany and England the private inspector of the lead factories must be a man acceptable to the Government.

The private inspector of a large factory or of a group of factories, who is always on the ground, is in the best position to make use of the practical devices for the protection of the laborer that are the most apt to be originated by the man of mechanical mind actually at work in the industry. He can stimulate interest in

the care of the workmen on the part of the owner, can show the value of eye and other examinations, and, if need be, can protect the factory against small-pox and typhoid by vaccination and against many other diseases by early segregation and proper sanitation. There is no reason why the health of the employees of a large industrial plant should not be protected just as is that of our army at present. The bitter lessons of the past should be learned and applied. Flies, rats, mosquitoes, toilets, expectation, offer problems everywhere. The private inspector can solve them if given power and financial assistance. He can study the occupational diseases of his own particular plant and contribute much to their eradication, by bringing the responsibility home to the owner. Certainly we must find room in our scheme for the private inspector, "the family physician of the plant." Without him, or such supervision as he alone can give, no plan for the protection of the employee will be first-class.

Next to the private inspector will come the local municipal inspector who, except for the control of contagious diseases and for the enforcement of ordinary sanitary regulations, is not apt to be effective. He is like the policeman, too close to his job, too apt to be a political hack and too readily persuaded and moulded. In order to get the most out of the police power in its relations to industry, the officer with final authority should at least have the backing of the state, that of the nation would be better. I have often thought of the experience of a friend of mine in San Francisco, after the fire. A number of policemen were trying to hold back a large crowd from crossing Market Street at a certain point. Along came a squad of soldiers—one private was assigned to the work ineffectively done by the policemen. Here was a stranger under orders—a new force—the crowd knew the policeman and his limitations in such an emergency. The private paced back and forth, no one stirred. Finally one man started to run across the street, the private took his gun by the butt, knocked the man back into line, and marched along as before. No one tried it again. Here was an impartial citizen with a loaded gun carrying out orders—pulls, graft, blandishments did not apply.

So should it be with the medical inspector, impartiality, power, effectiveness.

The state can do better than the municipality or county, and to it, under existing conditions, we in the United States must look. In Massachusetts a good scheme has been worked out. The state is divided into health districts with state medical inspectors in each. They have full power to investigate contagious diseases, but their eradication depends on the local officer, as does also the mitigation of nuisances. The inspectors act as intermediaries between the local and state board of health in considering all influences dangerous to public health and in the prevention of tuberculosis and of other diseases dangerous to public health, but they act independently of local authorities in the investigation of the health of minors employed in factories and the sanitation of factories, slaughter houses, public buildings and tenements in which clothing is manufactured. That there are "twilight zones" where there is overlapping of authority and where gaps exist is evident, and in these lies the opportunity for poor work, bad conditions, contests, court decisions and other blocks to effective control. The actual power of seeing that needed changes are made and regulations enforced should be in the hands of the state. Legislatures should seek for more centralization of police power in all health laws. A state inspector should be able, with the assistance of the state board of health, to close up any establishment maintaining dangerous or unsanitary conditions. The Massachusetts law sails between the rocks set up by multiple units of government and is worthy of imitation. Perhaps it is the best we can do at present. The need of making the municipality responsible in many health problems must of necessity limit the power of the state. The knowledge of local conditions and the need of prompt action makes the local forces absolutely essential in many ways. The state though must feel its responsibility. Legislative appropriation for specific purposes stimulates a sense of responsibility and is to be systematically encouraged along all the lines of public health.

We can hope for no such development from the national government in industrial control as has taken place in the history

of the U. S. Public Health and Marine Hospital Service. The establishment of sick insurance and the care of sailors is not a matter of state concern and the great power of port quarantine cannot apply to the industries. The national government can, though, make investigations such as those of the present U. S. Bureau of Labor, without formulating laws or regulations. Publicity is the greatest desideratum and sound knowledge and the training of sound investigators can be taken hold of by such forces as the public health service, the bureau of labor, and particularly by a department of health when one is created. As previously indicated my faith in national regulations of large enterprises is greater than in that of the state, but I see no way to bring it about in this connection. One who has seen the long arm of the national government impartially administer justice where state and local governments have been grotesquely laughed at, yearns for such control over conditions where money and life combat together on a large scale.

It is clear that the way has been found for a fairly satisfactory regulation of the industries in their relationships to the health of the workers. The public has recognized the need and in many ways the industries are meeting the details. We can urge then the desirability of the private inspector, the need of the state inspector, with power enough to be effective and without power enough to displace the responsibility of the local inspector, the abolition of as many of the "twilight zones" of responsibility as possible and over all an investigating, training, stimulating force under the national government.

XV.

MEDICAL SUPERVISION IN DANGEROUS TRADES. \

By **GEORGE M. PRICE, M.D.**, Director, Joint Board of Sanitary Control in the cloak, suit and skirt, and dress and waist industries, New York City.

Industrial efficiency is not an engineering problem alone. It is also a medical problem. The human factor in industry is more important than the mechanical and technical devices and appliances and needs medical supervision surely no less than the mechanical parts need engineering supervision.

Medical supervision is necessary in all trades and all industrial establishments. But it is especially imperative in what are called "Dangerous Trades." By these are meant all trades where there are poisons, gases, fumes, or infections to be found, either due to materials or to the industrial processes. Medical supervision must begin in dangerous trades and be extended later to all industries alike.

There are two forms of medical supervision of dangerous trades: (1) by states; (2) by individual owners of factories.

State medical supervision of factories has not as yet become a fundamental part of factory legislation except in a very few countries and states. The only European countries in which state medical factory supervision is an established fact are England and Belgium. There is no medical supervision in other European countries except so far that we may here and there find a medical man in the factory inspection department of the state. England has a section of medical inspection attached to the factory department, consisting of a chief inspector, with, from this year on, four assistants; and has also over twenty-five hundred certifying surgeons, who may be called medical supervisors of factories, in that their functions are (1) certification of minors for permission to work; (2) investigation of industrial accidents; and (3) reporting and investigation of occupational diseases.

In Belgium a similar system is in practice, there being a chief medical factory inspector with three assistants and several hundred medicine aggrégé, whose functions are similar to those of the certifying surgeons except that they do not certify the chil-

dren for admission to factories but pay more attention to occupational diseases and to first aid facilities in factories.

In the United States, medical factory inspection is confined only to the States of New York, Illinois, Massachusetts and Pennsylvania, New York State having been the first where a medical factory inspector was appointed, Illinois having appointed a medical factory inspector three years ago, and Pennsylvania and Massachusetts having introduced medical factory inspection during the last year. New York State has now a separate division of medical factory inspection consisting of a chief and two assistants.

These attempts at medical supervision of factories are still, however, very crude, desultory, insufficient and inadequate. A proper state medical supervision of factories means much more than the simple appointment of one or more medical factory inspectors attached to the factory inspection department. It means a thorough, comprehensive supervision of every industrial process or establishment which may be included under the designation of dangerous trades. Such a supervision is evidently impossible with the very small force usually found in the inspection departments.

There is really no reason whatever why industry and the captains of industry should wait for the state to establish a compulsory medical supervision of factories. They should do it themselves. Indeed, it is pleasing to note that a great many large corporations and industrial establishments have already established a medical supervision of their own and a great many others are on the eve of such a work.

Because the present tendency in industry is to establish medical supervision and because so many large factories and industrial establishments are contemplating such work, it is timely to discuss the purpose of medical factory inspection, qualifications of medical supervisors, and to define their functions.

The purpose of medical supervision in dangerous trades is to conserve the human factor in industry, to preserve the health of the workers, to prevent occupational diseases, and consequently to increase industrial and human efficiency.

The two most important qualifications besides medical education, necessary for a medical supervisor in dangerous trades, are: (1) a knowledge and thorough training in industrial hygiene, and (2) a social viewpoint.

The medical supervisor in a factory is intimately connected not only with the personnel of the industrial plant, but also with the sanitation, the technique and the special industrial and mechanical processes therein. Unless he has a thorough knowledge of the industrial processes with which the workers in the shop come in contact, and unless he is cognizant of the particular dangerous materials and processes within the establishment, his work in prophylaxis will be nullified.

He should also have a knowledge of sanitation of industrial plants and not be like the physician of a large lead plant in New York, who didn't know whether there was hot water in the plant or not.

Unfortunately, our medical colleges have not as yet included in their curriculum a study of occupational diseases and of industrial hygiene; and we cannot blame the physicians who are engaged as medical supervisors for their lack of technical knowledge of industrial conditions.

The second important qualification which I have mentioned, I consider of great importance. The physician appointed as medical supervisor in a factory must have the proper social viewpoint. I do not mean by this that he should be a socialist or a member of a labor organization, but he should be imbued with the principle of industrial justice and should not regard the worker, whether native or foreign, as an inferior being—as a “wop,” a “hunk,” a “polak.” In my investigations of a large number of factories, I have met physicians attached to the factories, whose regard for workers was so contemptuous that their work of the medical supervision could be of no value.

As to the functions of the medical supervisor, these may be summarized as follows:

1. Sanitary supervision of the plant.
2. Technical prophylactic supervision of the dangerous processes.
3. Preliminary examination of all applicants for work in the factory.

4. Periodical examination of all factory workers.
5. First aid and treatment.
6. Medical supervision of health of the workers.
7. Educational work.

By sanitary supervision of the plant I mean a general supervision of the sanitary aspects of the factory: its light, ventilation, dust removal, the drinking, washing and bathing facilities, the methods of disposal of refuse, rubbish and dirt, as well as sewage and factory waste; and the construction, maintenance and condition of the toilet and other similar matters. A sanitary supervision involves not only a general inspection but also a daily routine examination into all these sanitary aspects of the factory.

The technical prophylactic supervision of dangerous processes is absolutely indispensable if the medical supervisor of a factory in a dangerous trade is to consider his work of practical value. There are many toxic and other materials which may readily be substituted by others less dangerous; there are a number of processes which, after proper study, may be simplified and changed so as to lessen dangers to life and health; and there are many technical points in industrial control that are of great importance to prophylaxis. The engineer, the superintendent, the foreman, have for their functions the improvement of the mechanical processes, the increase of industrial efficiency and a corresponding increase in production. The health of the workers and the prevention of diseases is no function of theirs. Hence, there should be some one in the plant who should be intimately acquainted with all the mechanical and industrial processes in the establishment and who should supervise these processes with the sole and only purpose to lessen their dangers to health and to prevent occupational diseases.

It is unnecessary to dwell upon the imperative need of giving a thorough physical examination to every applicant for work in a dangerous trade. The engineer or technical supervisor of the plant will not for a moment think it advisable to accept a new machine in the plant which has not been previously tested as to its construction, etc., and which has not undergone a thorough test and scrutiny. Why the same practice should not apply to every

new worker in the factory is difficult to understand. There are persons who should not be admitted into a factory where particular dangerous processes are carried on or dangerous materials are handled. Therefore, the preliminary medical examination should be a routine practice of the medical supervisor and should be done thoroughly and scientifically.

A periodical examination of every worker in the plant is another practice, the necessity of which needs no explanation. The question is only how often these periodical examinations ought to be made. Professor Teleky thinks that in lead trades a bi-weekly examination is necessary. In some plants this examination is made at too long intervals. Workers in very dangerous processes should be examined at least once a month, if not every two weeks. This, of course, aside from the fact that all workers should be instructed to present themselves to the physician at the slightest symptoms of sickness. During this periodical examination it is possible for the medical supervisor to recognize the first symptoms of lead and other poisoning and to prevent further progress of the disease by changing the work of the employee or by giving him a rest from certain dangerous processes.

The medical supervisor in a factory should also have charge of the first aid facilities in the shop. Such first aid facilities should be appropriate to the character of the dangerous materials handled and processes carried on within the shop and should contain not only the various apparatus for resuscitation and first aid treatment for injuries, etc., but also such neutralization materials and special prophylactic medicaments that may be appropriate for each special factory.

The supervision of the health of the workers should not be limited to the functions mentioned, but should be extended to a general supervision of the health of the worker, whether within or outside the factory—to nutrition, clothing, housing, etc.—so that the physician may be able to come in contact with the worker even outside of the shop, to recognize the elements of danger in his sanitary surroundings and to give him proper advice which would lead to the preservation of his health.

With the above medical functions, however, the work of the medical supervisor in a dangerous trade is as yet not exhausted.

The function of the physician in a shop in a dangerous trade is not only medical but also educational. He should not only examine and treat the worker, not only inspect and supervise the plant, but he should above all endeavor to instruct the worker in the risks and dangers of his calling, to teach him the proper methods of prophylaxis and to educate him in the proper methods of health preservation and of prophylaxis of occupational diseases. Such educational activity would be the climax of the benevolent activities of the medical supervisor in the factory and would be the most useful contribution of the medical men towards industrial efficiency and industrial justice.

XVI.

PREVENTION OF INDUSTRIAL ACCIDENTS AND SICKNESS BY SYSTEMATIC INSPECTION OF PLANT AND EMPLOYEES.

By **H. W. JORDAN**, B.S. in Chemistry, Manager Department Special Products Solvay Process Co., Syracuse, N. Y.

The increasing state and federal control of corporations, and the trend toward socialistic legislation, make it imperative that employers maintain safe and sanitary working conditions to the highest degree. The volume of such legislation is large and its spirit hostile, because a portion of employers have been indifferent and have failed to maintain wholesome working conditions. The more progressive and successful corporations have constantly regarded welfare or efficiency work of equal importance with production, because their experience has proven physical efficiency to be as profitable as the efficiency of machinery.

The easiest and cheapest way to prevent fires and accidents, and to minimize sickness, is to maintain regular inspections of one's plant monthly, or at least quarterly, and to follow the suggestions for safety resulting therefrom promptly, by removal of the causes of fire, accident or sickness. The inspections should be made by executive employees and be supplemented by inspection committees of operative employees.

To obtain the greatest safety, annual inspections should be made by an independent inspection bureau. The work of these trained inspectors is superior, because their experience is extensive and they are not hampered by prejudices or by local or personal influences, which often warp the judgment of employee inspectors.

The methods of protection against fire and accident are so thoroughly standardized that one need not go into their details at this time. The important requirement is that regular inspections be maintained, that the recommendations be audited annually by an independent inspection bureau, and that all reasonable recommendations be promptly adopted.

Emphasis should be laid upon the value of neatness and good housekeeping throughout the plant. Analysis of industrial plant fires and accidents, shows that from 30 to 50 per cent. occur from heaps of rubbish in cellars, in corners, or under stairways, and accidents from loose material falling, men stumbling over tools left on stairways, projecting nails and splinters, wrenches and hand tools in ill repair, and from similar simple cases of negligence, or poor housekeeping.

As city population grows more dense, and as our social structure becomes complex and thoroughly commercialized, the individual workman loses much of the self-reliance which characterized American labor thirty years ago, when our highly organized and intense industrial development began to come into existence.

The working people are at especial disadvantage because our industrialism has not been accompanied by the development of a common school educational system designed to train twentieth century workers for twentieth century methods of earning one's living. Instead, we have retained the early nineteenth century school system, which focuses elementary education upon preparation for college. This system has transformed our industrial and commercial workers, who comprise ninety per cent. of those entering the common schools, into one-job workers, who are mere spenders of money and victims of popular fashion and commercialized amusement, instead of being versatile producers of the necessities of life, of thrift, and of contentment.

Employers must cease to let the social situation drift into the complete commercialization of every human interest, which interests a quarter of a century ago centered in the home, the church, and in a few simple, inexpensive pleasures.

Employers must unite to create a new system of education based upon the principles evolved by Madam Montessori. They must help establish practical work in child welfare and public recreation, and they must co-operate in correcting the conditions which make our people thriftless, inefficient and discontented.

Especially they must institute practical methods of preventive hygiene, to reduce to a minimum the superabundant output of tramps, criminals, insane, idiotic, and all other subnormal, de-

pendent and unemployable humans, who constitute seven to ten per cent. of our city population; and they must devote thought, executive ability and money toward securing the highest social, normal and physical welfare of the working people, in order to transform the present hostility of labor into efficiency and contentment.

The physicians who are medical inspectors for corporations, who examine applicants for employment and attend the employees disabled by accident or sickness, constitute one effective agency for helping attain these social and economic results. These physicians, by co-operation with the free dispensaries, the associated charities, the crippled children's guilds, the probation officers, and similar civic organizations and officials, can direct the energies of such organizations to those persons in the community in need of help or restraint, and who, by reason of this need, are unemployable.

It is only necessary that each such physician note on his individual case report to his employing company, the social condition and needs of the patient and of his family, if the case involve a visit to the home. This information, reported daily by the company to the proper civic agencies, would bring these individuals and families under observation and ensure their effective social control.

This system would ultimately eliminate a large proportion of the subnormal, unemployable humans, together with the heavy cost of their maintenance, and would raise the efficiency of all working people, and help mightily in reducing their unhappiness and discontent.

A valuable part of this work could be done by close attention to the candidates rejected for employment. Each such unemployable person is a civic problem, for physical or other reasons, and is in need of as much, or more, attention than employees who meet with accidents or become ill during employment.

Periodical inspection of individual employees may be difficult to secure, although in Illinois and the middle west, some corporations have successfully instituted such physical inspection. One company in Chicago examined 6,800 employees, and found 193

with tuberculosis, 40 with advanced kidney diseases, 200 with communicable diseases, and a large proportion subject to anemic, nervous and other debilitating and incapacitating disorders.

At first an annual, or semi-annual, examination should be offered without charge, to detect preventable diseases of the major organs. It should include examination of the eyes, mouth, nose and throat, blood pressure, sputum and complete urine analysis. Cases of individuals in whom organic diseases are prevented or retarded and whose effective lives are thereby prolonged should be published by bulletins to all employees, in order to promote the work by education.

The examination should be offered free, or for a nominal fee, to the families of employees, because often the illness of an employee is the result of conditions characteristic to a part or all of his family, so that no material progress in preventive hygiene can be made in his case unless his family be given the benefit of adequate medical and preventive treatment.

Group life insurance, which is maintained by many progressive corporations, offers an excellent opportunity for annual examination of employees. In the maintenance of this insurance, no employee would be dropped from insurance on account of physical unfitness, after having been admitted at the end of one year's continuous employment, because that is contrary to the principles of group insurance, but the annual renewal of insurance to employees would offer an opportunity to make individual physical examinations, in order to detect preventable diseases and thereby prolong the productive life of employees.

Group insurance granted to employees who have completed one year of continuous employment, and who are then in good physical condition, if allotted for \$100 at the end of one year's continuous employment, \$200 at the end of the second year, and increasing to a maximum of \$1,000 for the tenth and each subsequent year, and combined with an annual physical examination of each employee, is a most powerful means of maintaining effective, continuous and contented employment. The annual cost is \$10 to \$15 per \$1,000 of insurance in force, equal \$6 to \$10 average per person insured, or \$4 to \$8 average per person em-

ployed, if employees who have not completed one year's continuous service be not admitted to insurance. In most industries these persons less than one year in employment, constitute 15 to 25 per cent. or more of the total employees.

The trend in industrial Europe, as in our country, is toward governmental control of individual health and welfare. Those corporation executives who have the clearest and most penetrating foresight will anticipate and help to modify radical or socialistic legislation by instituting practical health, welfare and efficiency work for their employees, rather than delay such action until employers are dragged into it by hostile legislation.

XVII.

RULES AND REGULATIONS IN OPERATING PLANTS— CARELESSNESS AND RECKLESSNESS.

By JOHN B. LOWMAN, M.D., Surgeon to the Cambria Steel Works, Johnstown, Pa.

The question of making rules and regulations for an industrial plant depends on what sort of an industry it is. Rules for a rubber factory or woolen mill will not apply to a steel works or an automobile factory. Such rules should be adapted that will meet the requirements of the different industries by men of experience in their different specialties. There are certain rules, however, that are adaptable to all industries. I speak of the hygienic and sanitary condition of plants, the age of labor employed, the examination of the employees, the proper examination of the water supply, disposal of sewerage, ventilation, and the teaching of the employees the proper methods of living and care of themselves and families. This should all be under the supervision of a physician who has had a practical experience in this line and who has lived among the families of the different classes employed in industries, plus his knowledge in sanitation and hygiene. It has been my good fortune to live in an industrial city and also to be connected with the Cambria Steel Company. I shall speak of this side alone. Steel plants employ all classes of men who are divided into the skilled and the unskilled labor. The age of employment varies from fourteen years (which is the minimum according to our State Law) up to sixty. The employees are composed of most all nationalities, American and foreign. The foreign element is principally composed of German, Slav, Hungarian, Polish and Italian. Hence, to deal with all these nationalities one must be a fairly good linguist. These men are employed in many different departments. Mining, blast furnaces, rail mills, machine shops and finishing departments. To look after the welfare of so many men is by no means a small task and requires much thought and hard work. It has been shown that the greatest number of accidents, seventy-five per cent, take place among the unskilled labor which is composed of the foreign ele-

ment principally. The employer has commenced to appreciate the efficiency of the employees because he gets better returns. Somewhere I saw this statement: If physical efficiency is an absolute and vital necessity to the working man, so to him are certain necessities for maintaining that physical efficiency. Hence, many industries have organized social and welfare workers, safety committees and instructors. We have a safety department which is composed of experienced men who investigate the causes of accidents and the remedy for the same. The instructors instructing the men in first aid treatment, and proper care of the injured, are under the direct supervision of the surgeon of the plant. If this is put under trained nurses and instructors without the supervision of the surgeon or medical man, many times they overstep their authority and treat cases and take responsibilities which should come under the direct care of the physician. I believe that too much authority is given at the present time to the social and welfare nurse. Therefore, in my plants I insist that everything from the purchase of medical supplies to the smallest article go through the hands of the medical man and be approved by him before being used. In this way I know of each article, where it has been used, how, and for how long.

It has been my good fortune to be connected for twenty years with the management of their hospital for the treatment of these cases. I believe the Cambria Steel Company was the pioneer in looking after the welfare of their men, and it was not until many years after that other industries saw the good derived from this branch. In fact, one of the biggest industries in the United States only took up this work not later than ten years ago. So quickly did they see the good derived from the same that they have spent thousands of dollars and perfected a most wonderful system for the care of the employees. In 1887 the conditions were about as I describe. The nearest hospital to our plant was eighty miles away. If a man was injured he was taken to his home where the operation, if necessary, was performed; many times in a two-roomed house with four or five in a family. There was no provision for the safety of the employed, no proper dressings,

waste, tobacco, oil used locally and whiskey administered internally until patient was intoxicated. These were the great antidotes before the sensible first aid treatment. Under these conditions the surgeon had many embarrassments and complications to contend with in the care, treatment and operations which he was required to perform. No convenient or suitable place to perform the simplest operation, no trained nurse to carry out his instructions, in fact, all sorts of complications handicapped the surgeon. Nothing clean or aseptic, many times the surroundings being dirty. Not even a clean bandage or dressing to apply to the wound after operation. No prepared ligatures, no absorbent cotton, lint or gauze could be bought, but all had to be prepared by the surgeon himself as the emergency required. No questions were asked as to the cleanliness or sterility of any dressings. It was just such a condition that induced the Cambria Steel Company in 1887 to start and maintain a hospital and system of first aid. Time will not allow me to go into details and to give statistics and mortality table showing how accidents have decreased. It is the purpose though to try to bring out the value of instruction in first aid and care of the injured and sick. Over this short period of time it has led me to a system which gives the injured employee the very best for the relief of his sufferings. This instruction has a far-reaching effect. It is carried to the homes of the employees where the families are taught to improve the conditions of their homes. This has been impressed on me more than once by the visiting of the afflicted at their homes after their return from the hospital. You see their homes tidied up, nice clean bedclothes on the bed, windows up and good ventilation, and they have learned the necessity of bathing. I recall one morning being called to the house of a foreigner where the surroundings were at the least, uninviting. Dirty, with the windows down tight, foul air, the mother and children in such a condition that I believe she would have to wash their faces to tell one from the other. I had the man sent to the hospital for a badly infected leg. After a few week's stay in the hospital, he was discharged. I had occasion to be in the vicinity in which he lived and stopped in to see him. To my surprise, conditions

were much improved. The home was cleaner, windows were up and the children were recognizable. When questioned if he had had a house-cleaning, he replied, "Everybody wash and clean every day, feel good like hospital." I merely mention this as one of many of the good results that come from this work. When we look back before the days of first aid and think of the many limbs that were sacrificed, the many stiff joints and crippled men, many of whom you see sitting around the works yet, and compare with the present, the advance for the safety and care of the employees has been most rapid. The sacrifice of a limb nowadays many times means a defeat for the surgeon. This has been brought about by the intelligent instruction in first aid among the working men. The primary dressing means, in many cases, the life or future usefulness of the injured. To demonstrate by practical experience the good results from the care of the injured, the Company built houses for the men and encouraged them by small payments to buy their homes. I believe there is no better way to improve social conditions among industrial workers than by encouraging them to own their own homes. They then take pride in their little home and become encouraged to prevent many conditions and diseases seen in tenements. It has been my experience in talking to many men who for years did not know how to buy a house and lot and so drifted along any way spending all they made. When once shown and encouraged how to do so, they have saved and provided a home for themselves and families. Many systems as to the rules and regulations of the sick and injured are in force, each year being perfected by past experiences. I shall not speak of the many laws in the different cities as to factory instruction and labor commissions but confine the rules and regulations to that which has been in force in our plants. The following is a résumé of a system to encourage the men:

To get everyone thinking about safety and to promote the safety habit, it has been decided to form safety sub-committees in our different departments, on the plan outlined hereinafter.

Each sub-committee will be composed of two or three men who have been in the employ of the Company not less than a year. The members of the committees will be selected by the Superintendents, and will serve three months,

the first appointees, however, to serve two or three and four months, so that the terms of service on the committees will overlap and give newcomers the benefit of the previous committeemen's experience. Inspection will be made Saturday afternoons at least once during each month by the committee in a body. While on inspection duty, men of the safety committee will be paid full rate, if day workers, or allowed their average hourly earnings for the week, if piece workers. Safety committeemen, whether on inspection or not, are asked to report anything and everything they see about the plant they think unsanitary or dangerous or likely to cause someone to be hurt. If they think of some way to make safe the place or thing they report, suggest it, but make the report anyway. It may be someone else can think of a way to correct the trouble should the person reporting it be unable to do so.

Reports and recommendations will be made on forms provided for the purpose, and signed by each member of the committee. All such recommendations will be delivered to the office of the Superintendent of Department, who will note thereon whatever comment he has to make regarding the recommendation, and transmit same to General Manager's office with daily Break-down Report, when it will have consideration by the Central Safety Committee.

All safety committees are to report anything that they think dangerous wherever found throughout the plant where their daily duties may take them. All employees are invited to call to the attention of the Safety Committee members in their Departments anything they can suggest that will likely save someone from getting hurt. It will be the duty of the Safety Committees to report guards that are not in place, or neglect of men to avail themselves of safety appliances of any kind provided for their protection. In case of any accident in their department, involving loss of time on the part of the injured man, the safety sub-committee is to furnish written report to the General Manager within twenty-four hours of such an accident, stating nature and cause of accident, and how, in their opinion, similar accidents can be guarded against in future.

At intervals the Central Safety Committee may have the sub-committee inspect departments other than those where they are usually employed.

We wish to make this plant clean, safe and sanitary, but we cannot do it without the coöperation and assistance of every man who works here. The Company is doing all it can to prevent accidents but there will be maimed hands and feet and blind eyes unless every man is careful of his own safety and the safety of his fellow men. If you know that a thing is dangerous, don't let it go until you or another gets hurt—report it at once. If you see a new man taking chances, warn him. You would willingly contribute to the help of a disabled man's wife or family, yet it is a thousand times better to prevent that man from becoming disabled.

In answer to a letter written by me to the first aid men, I received the following:

Referring to our conversation regarding the safety work at our plant, I am handing you herewith several notices which are posted throughout the different departments.

We have received to this date one hundred sixty-one suggestions from these safety sub-committees, the greatest number of which we consider very good and have been approved by the central safety committee. I would say that out of the total number of suggestions made, less than six have been rejected. We find that the men appointed on these safety sub-committees are rather proud of the honor of serving and take great interest and an active part in the work. Each member of the committee is furnished with the safety-first button.

We are endeavoring, as rapidly as possible, to place suitable guards over all belts and gears and at every point where we think there is the least possible danger of a man meeting with an injury. We are also conducting a vigorous campaign to try to break up the practice of repair men permitting loose boards or blocks, in which there are protruding nails, lying about the floor or ground.

We are now making up a list of different operations, also ways of handling material, and when this list is completed we expect to have photographs taken showing the dangerous and safe way of performing operations or handling the material.

As soon as possible after an accident occurs, *i. e.*, after the injured person is properly cared for, a thorough investigation is made and a poster giving the name of injured person, nature of injury, details of how the accident occurred and how same could have been prevented is placed on bulletin boards: first at the main entrance to works and later in the department in which the accident occurred. Should an accident or injury be prevented by any of our safety guards, the use of goggles, glasses, or any of the safety devices provided, the details connected with same are written up and posted for the benefit of the men. Also, should any person be injured and it is found that the injury could have been prevented by the use of safety devices which have already been furnished, the details connected with this injury are posted.

We are working along the lines of sanitation, it also being the duty of the safety sub-committees to report any condition of uncleanness found in any department. We have installed in our pattern shop a modern lavatory which we think is appreciated by men in the department. We have also just completed in our steel foundry a lavatory fitted with stools, urinals, individual wash bowls, shower baths and lockers. The men in this department have apparently fallen in with the idea. A great number of our Moulders, Core Makers, and Dry Floor men now come to work wearing new clothes, making the change to their working clothes after reaching the plant.

In addition to this, each department has its first aid team with an experienced instructor employed at the plant. Twice yearly a competition drill is given with prizes for the best team. This stimulates interest among men and has brought the most remark-

able results. By this method, the infection in the past ten years at the hospital has been reduced from five to ten per cent to one-fourth and one-half per cent. As to the health of the employees, the condition living up to this must begin at home under the proper supervision of the physician and welfare nurse. This, I am sorry to say, especially among the foreigners, is hard to do. A man to retain the proper resisting power and keep in good health should have the best of home surroundings. Good food, ventilation and proper rest. One of the best methods to prevent this condition is by proper instruction of their children at school. This seems to me an important subject. We find that the average girl or boy leaves school before entering high school for the simple reason that he derives nothing by going farther, as manual training, industrial trades, etc., are not taught. By the proper playground system, swimming pools and hygiene instruction much is being done to improve the hygienic conditions of the coming generation. Many of the foreign boarding houses are the Mecca of disease producing lung and bronchial conditions, to say nothing of the skin, venereal and other afflictions. Let us picture for a moment the condition of these houses. A house with two rooms downstairs, kitchen and front room. Possibly three upstairs, ten by twelve, and one room in the attic. The front room downstairs being occupied by the "boarding Boss" and his wife, with possibly three or four children. A double bed in each corner of the rooms upstairs occupied by eight men, these men going out to night turn are occupied by eight coming in from day turn. The boarding boss and wife take care of as many as thirty-eight to forty-eight men. The windows are always down tight, the air being stuffy when you enter these houses. These men are boarded so much with beer and so much without. Is a man so housed in a fit condition to use his energy for twelve hours at a time? This problem must be settled by the settlement worker. Many industries have welfare men and women who go to their homes under the instruction of the physician and instruct the families in the proper ventilation and methods of living, which, I am glad to say, is bringing most brilliant results. One of the first rules should then be the prevention of such

men with suspected bronchial or skin diseases working in plants with other fellow members until they have a clean bill of health, which leads up to the proper examination of each man employed before going to work which I shall speak of later. After such regulations are carried out, it is then up to the employer to make these plants as sanitary as possible. I believe one of the most important features is the examination of every employee before going to work. He should have a good physical examination of his eyes, lungs, kidneys, hernia, skin eruptions and general physical condition. If found to be deficient, he should be acquainted with the facts and the condition remedied. I believe there are many men working with defective vision, which, if corrected, would enable them to have better energy for work. If the bronchial conditions were looked into, we would not have to have so many signs of "no spitting allowed." I believe this is hard to carry out thoroughly, but in some of the smaller plants it has been done with most brilliant results. It is not proper for an industry to employ an epileptic when he is liable to have an epileptic seizure injuring himself or some other employee, or a man affected with heart disease working at a great height and liable to fall, or those afflicted with tuberculosis among the body of workers, etc.

Dr. Farnum of the Avery Company spoke before the Illinois Manufacturing Company in Chicago as follows:

When the Avery Company was started a year and a half ago, three or four cardinal principles were accepted as being of equal advantage to the employer and to the employee. These cardinal principles were based upon our dealings with the men as individuals. The first of these was that the work of this department should be a distinct effort toward the increase of two things in their widest sense—productiveness and protection. In other words, a matter of safety on one hand and efficiency on the other, and we believed that safety efforts should begin with the man, rather than with the machine, not that we belittle in any way the machine side of it. We have our safety inspectors, and we believe we have corking good ones, but we do believe that you can't have safety without safety men. You can't make good cylinder teeth unless you have good material, and likewise, you can't make good cylinder teeth unless you have good men to make them. You can't have a safe shop without safety devices, but on the other hand, you can't have a safe shop with all your devices unless you have safe men. Another of our cardinal principles

was that we should accumulate the greatest possible amount of information that could be acquired concerning employees, individually and collectively, because of the value and advantage this data might give us in our effort to get at the truth concerning any matters that might arise. Another of those cardinal principles and one that we have harped upon not a little, is one that has become sort of a slogan at the Avery Company, and that is that "The Company cannot profit unless the men profit first."

The Medical Department was installed a year and a half ago, and since that time very little has been said of the physical examination of the employees. Instead, we talk about the medical supervision of employees, which you will readily see is a very large field, of which the physical examination is but one little corner. Since the establishment of this department, not only have we examined physically every man who was in the employ of the Avery Company at that time, but we have examined every new man before he went to work. We found, it is true, a few men who made some noise, and sputtered around a bit, but those men of whom I have a number distinctly in mind, are the very fellows who are now boosting the hardest for what we are doing. Withal, the opposition did not amount to much. A few minutes straight talk settled the whole matter, and every man was examined.

It is a fact, though the men were not told of it, that no man already in the company was to be discharged on account of his physical condition.

If a man's condition was not compatible with the work he was doing, he was put at something else. We believe that the men already in the employ of the Avery Company deserve protection, and we have worked very hard to protect them from undesirable applicants.

A man comes to the plant looking for employment. The head of the Employment Department, who also, by the way, is working on the same plan of getting the greatest possible amount of information concerning these men, individually and collectively, talks over with him the work he has been doing and what he can do, and if this individual seems to fit the requirements of some given requisition that he has, he sends him out to the foreman of that department. The foreman, if he decides the applicant is desirable, returns him to the Employment Department. The Employment head or one of his assistants goes over the shop rules with the man, fills out his application for employment, which goes still further with the matter of acquiring information getting a lot of history of a nature that might be called industrial history in contradistinction to the medical history which is taken later.

If the head of the Employment Department, in the course of this history taking, discovers anything that makes the man seem unsafe or undesirable, he goes no further. If not, he sends him into the physicians. We have three physicians on our staff, two of whom work each morning with from four to six assistants. The first part of the morning's work is the dressing of accident cases in order that the men may be sent to work at their usual time, and then we get to the physical examinations. A rather comprehensive but in a

manner concise history is taken as to the man's previous health, accidents, injuries, and habits, and then the examination is made. He is weighed and measured, and his temperature taken. His chest is examined, his lungs and heart are gone over with special care. His abdomen and genito-urinary tract are examined, including a urine analysis. His ears are examined and his hearing is tested. The condition of his nose, throat, mouth, teeth and gums is noted. His muscular system, glandular system, extremities and reflexes are all gone over thoroughly. There are in all one hundred and ten items in the examination of every man, to say nothing of a large space left for general remarks and recommendations, and sometimes this space is entirely filled out. This, we consider, is a little more comprehensive and a little more searching as to physical details than the average old line life insurance examination.

The first question that naturally arises concerning this is the matter of its expense and next would be what could possibly be the use of such elaborateness in this examination. I could not possibly answer these questions better or, if they were in the nature of criticisms, defend our system better than to go over with you the advantages we think we are getting out of the work that we are doing. One is unconsciously in the habit of figuring out advantages of work of this sort from the standpoint of the employer on one hand and from the standpoint of the employee on the other, but when you come to figure out the results of this medical supervision of employees, it is a pretty hard matter to know just exactly on which side of the fence to put some of these things. Some of them are really just as much to the advantage of the men as they are to the advantage of the company.

For there is another side to this question that must not be overlooked and that is the mental side, for a workman is by no means a mere physical machine. In the future we are going to hear a great deal more about the psychology of accident prevention than we have heard in the past, and I think this is well worth while.

It is a very nice thing to wander through a factory and have the safety inspector point out all the numerous guards and safety devices that have been installed and we appreciate these things, but we are trying hard not to lose sight of the fact that first of all comes the man with his physical condition and his mental attitude, and after that comes the machine with its safety devices. Then, there is another of these two-sided advantages that we must consider, and that is the matter of fitting the man to his job. We have been hearing a great deal of late upon this subject in lectures and in magazine articles where men are selected for various kinds of work according to the estimate of them from their handwriting, or their complexion, or their type of physiognomy, and we at the Avery Company are heartily in favor of this. We are in favor of anything that gives us added information concerning a man, but we believe that the physical and mental side are vastly more important than the temperamental. A man's temperament as interpreted by his complexion may make some difference as to what work he may do, but we believe that

whether he has epilepsy or heart disease makes more difference as to what work he should do. This work is conducted as a unit by the various branches of the department and the numerous conferences that occur between the head of the Employment Department and the examining physicians as to the availability or advisability of a given man for a given job is a proof of that. Time after time, following one of these conferences, a man is shifted from the work that he applied for to something else with which his condition is more compatible.

Another of the advantages is the elimination of undesirable applicants. We maintain that the men who are already at work are entitled to all the protection that we can give them. We know from the statistics of our own department how many and what per cent are injured by the fellows working beside them. So we try to eliminate first the physical unfit—the men with defective eyesight, advanced tuberculosis, Bright's disease, rupture, heart disease, venereal infections, etc., that will greatly reduce their efficiency, increase their own hazard or that of the man beside them.

During the years which I have given to the study of this subject I have naturally arrived at certain opinions which are more or less fixed in my mind and I will, in conclusion, try and give a short summary of them.

Carelessness and recklessness among industrial employees is the cause of the greatest majority of sickness and accidents. This is shown by accident reports in our mills. Carelessness of the employees is due to many causes. I believe by far the most common is the overindulgence in alcohol. It has been for many years a by-word at the hospital. Following pay-day we will have lots of accidents. The mental condition of the man has a lot to do with such accidents. It is impossible to make any machine fool-proof or to explain the proper methods of living and expect to have them carried out, for man is a lazy animal at the best and will take many chances of the shortest way to do work, many times taking his life in his own hands. Men who work in high places soon become more careless than an ordinary person would. Persons in ill health and with body deformities working in hazardous places soon develop a sluggish way of working. Foreigners who do not understand the language put in hazardous positions easily become frightened and cause the injury of many of their fellow employees through lack of understanding. I believe carelessness in industrial plants is one

of the hardest conditions to remedy and only by the elimination of some of the exciting causes and strict discipline are you able to overcome them. In conclusion, the rules and regulations for operating industrial plants should commence at the home. By instruction in hygiene and right methods of living, the enforcement of temperate habits, no employee being allowed to work with his fellow men who had bronchial, skin, venereal diseases, or who has overindulged in alcohol. Persons with deformities or organic diseases must be employed in positions where there is no danger. The proper examination of all employees and a thorough understanding of rules for safety as given by the plant. Shops should have the best system of ventilation possible. Men who work in heat and moisture, when fatigued or prostrated, should have the proper showers and air by system of fans. All departments should have good lavatories properly taken care of, individual wash basins and showers and the best of drinking water. The water should be properly inspected and then only drunk through individual drinking cups or bubbling taps. Individual towels. The proper feeding of the employees is an important factor in plants. If it were possible to do away with the old dinner bucket and establish lunch rooms at the works for the employees, it would many times overcome many difficulties as to proper feeding. In conclusion, I wish to say that I have not undertaken to give rules for industrial plants but have given a résumé of my experience of what has been accomplished in the last twenty years among steel workers.

XVIII.

HEALTH MEASURES AFFECTING FACTORY EMPLOYEES—SOME REMARKS ON THE MEDICAL PHASES OF SUCH LEGISLATION.

By J. E. TUCKERMAN, A.B., M.D., Cleveland.

From a legislative standpoint health measures may be national, state or local. The bulk of the laws affecting the health conditions affecting factory employees are passed by state legislatures. It is obviously impossible for me to touch upon all the specific instances in which legislation bears upon the question. Even so seemingly remote a subject as the registration of births and statistics on trade conditions in general have a bearing upon the matter.

Laws regulating the health conditions of factory employees were first directed against accidents. But accidents are responsible for only a part of the morbidity and mortality incident to industrial occupations. Dr. F. L. Hoffman¹ has stated that industrial workers of this country lose annually 248,750,000 days in sickness, representing a money loss of \$772,892,860—one-quarter of which is preventable. An analysis² of the situation in Ohio shows that among the real workers in shops, factories, mines, offices, and stores, over one-half of the deaths, according to census figures for 1910, were due to preventable causes. Of these preventable deaths 1/7 were due to accidents and violence and 6/7 to the diseases tuberculosis, pneumonia, typhoid and poisons. For the United States, the National Council for Industrial Safety estimates the number of killed and injured in the industries of the United States each year at 2,035,000.³

All laws having for their object the control of working and living conditions, whether of factory employees or touching the matter of living of the public generally, have their medical side. These laws, or, if you prefer to so call them, regulations, must be founded upon known medical facts and administered with a full appreciation of their sociologic bearing upon the race. The

field is one for preventive medicine and for sanitation rather than for curative medicine.

The extent to which the application of known medical facts can control the health conditions of large bodies of men is well shown in the sanitary conditions obtaining on the isthmus of Panama. Similarly the control of cholera, plague, small-pox and yellow fever in the Philippines, Puerto Rico, and Cuba, are instances of what can be done through military supervision. And now we have at hand the reports⁴ of the wonderful results in the United States Army in the control of typhoid fever by vaccinating against it. An army of 90,000 men scattered through the United States, Philippines, China, Puerto Rico, Cuba and Hawaii, and some 12,000 of them camped in Texas during February of 1913, reports but three cases of typhoid fever, two of which occurred in unvaccinated recruits. There were no deaths. Compare this with the best record in any of our large cities.⁵ New York, in 1913, had 7 deaths per 100,000, while a city of 100,000 (the army has 90,000 men), Bridgeport, Conn., had 5.4 deaths per 100,000. For the whole United States, in 1913, the death rate was 12.7 per 100,000. And the army reports three cases, not deaths.

Such results can be obtained only when experts in sanitation are given full power to apply the known facts of medical science and the established methods of health conservation.

Health legislation coming in conflict with that which people have been wont to consider their personal liberty, we must in large degree depend upon education rather than force for the acceptance of efficient health regulation. The employer, as well as the employee, frequently considers state interference troublesome and unwarranted. Such exceptional conditions as those under which the medical and sanitary expert conducts his work at Panama, or in the army, are difficult, in fact impossible, to be established generally in the states, with the public attitude what it is. The public unfortunately distrusts experts and considers itself fully able to judge what should and should not be done in the governmental application of medical science. In a democracy the only way to accomplishment is thoroughly educating

the public to a faith in and reliance on the judgment of experts.

This is a long process, for the public will give its support only so far as it can see forthcoming results from past performances. Dr. Isadore Dyer says:⁶ "The public is a self-constituted critic prejudiced against the profession and clamoring for demonstrated achievements, but it is also a great child needing to be led into the ways of cleanliness and health. With the spirit of to-day the public is ready for education, and we owe it to ourselves to go more than half way in the effort to instruct it." It is fortunate that such proofs of the benefits of the application of sanitary science in Panama and elsewhere are at hand to serve as examples of what can be accomplished, and to furnish the text for popular education.

Like the public, being a part of it, the legislator holds a similar attitude of opposition but in a more intense degree, toward experts upon any matter. Particularly is this true when he is asked to give ear to the medical expert or to the profession at large. Whether we will or not, the medical profession has been placed in the attitude of a special interest seeking preferment at the hands of the legislators. Despite the fact that it has been through the efforts of physicians themselves that requirements for medical licensure have been raised and despite the fact that it is exceedingly hard to practise medicine but exceedingly easy to practise unhindered most any "ism," none the less whenever laws are passed regulating the licensure of physicians, they are considered of peculiar benefit to the physicians rather than to the public.

To change the attitude of the public and the legislature toward the medical profession, it should be our business to point out clearly that laws restricting practice to those having certain qualifications are laws for the benefit of the public and are in reality a restriction upon the individual liberty of the person desiring to practise.

It should be our business to make it clear that health boards and boards of medical licensure are not a part and parcel of the medical profession, but are agencies of the state having police power to protect the public and in prosecuting their activities are entirely distinct from the profession at large. We should en-

deavor to bring about that these bodies shall receive their funds from state taxation and not be hampered by inadequate amounts as are the boards of licensure when limited to funds derived from fees for registration and fines from prosecutions.

The profession should educate the public away from the idea that the profession has an axe to grind whenever medical legislation or legislation containing a medical aspect is under consideration. The profession should refuse to be involved in lobbying for any bill, but should be prepared and ready to give advice, founded upon knowledge of their particular subject, on any bill effecting directly or indirectly the health of the public.

The laws prescribing health and sanitary conditions for employees are essentially matters for experts. Questions arise in which the legislator and sociologist should have their views tempered by medical and business advice. These questions must be broadly considered from many sides, otherwise they fail of their purpose by being impossible of operation. A law intended to meet certain conditions is made to apply in special instances where it is unsuited. At the present time hospitals, and particularly small hospitals, in California are handicapped by an ill-considered eight-hour law for nurses.⁷

The extent to which laws go governing the conditions under which employees work is easily noted by consideration of the topics covered by laws of any up-to-date state. In Ohio the legislature of 1913 laid down four statutes. The first requires physicians to report to the State Board of Health⁸ instances of occupational disease; the second empowers the board to investigate industrial hygiene throughout the state and to inquire into all work factors which might in any way deleteriously influence the health of workers; the third provides that manufacturers of certain lead compounds shall make special provisions for the protection and welfare of their workers and provide monthly examinations by physicians of all workers exposed to lead substances; the fourth empowers the state board of health to investigate and pass upon the advisability of employing minors in any of the health-hazardous industries from which they are not already prohibited.

Among the industrial health hazards enumerated are dust, dirt, dampness, darkness, devitalized air, heat, cold and draft, fatigue, inactivity, caisson work, germs and infections, poisons, alcoholism, and risk of venereal diseases. The extent to which these health hazards operate is seen by the fact that a study⁹ of six hundred establishments in Ohio employing 124,000 people, shows 56,000 in hazardous employments.

Industrial insurance companies show¹⁰ that 3,000,000 people have industrial illnesses requiring a week's minimum layoff per year in the United States.

Some further idea of the medical aspect of the conditions under which factory employees work may be gathered from some of the headings in a pamphlet issued by the Ohio Departments of Workshops, Factories, and Public Buildings and entitled, "Laws Governing Factory and Building Inspection."

Safeguarding Machinery.

Inspection of Bakeshops for Plumbing, Ventilation, Washrooms and Sleeping Places.

Regulation of Sweatshops, Entrances, Water-closets, Unlawful to Employ Certain Persons.

Minor Laws, Preventing Employment of Children in Certain Occupations. Employing of Minors in Factories, Age Limit, School Certificates, Hours of Work, Meal Times, Girls Not To Be Allowed to Remain Standing, Etc., Etc.

Employing of Females in Sweatshops, Providing for Seats, Proper Water-closets, Dressing Rooms and Female Inspectors.

Inspection of High Explosives.

School Attendance Law, and

Law Touching Liability of Employer for Personal Injury to Employee.

It is not difficult to see the medical aspect cropping out through these topics, nor is it difficult to understand that their sociologic and economic bearing must be taken into consideration before there can be a proper adjustment. The public must be so educated that the employee shall expect healthful working conditions and the employer shall willingly provide them. There should be no idea of charity about it. It is merely justice and besides good business. "It is five times as much to the interest of the employer to promote welfare work than it is to the employee." And whether he will or not, the change of public sentiment is going to force proper conditions. The New York Supreme

Court in a recent decision¹¹ has recognized that industrial insurance is a proper risk to be placed upon an industry, just as much as disabled machinery is a charge against a business. The maintenance of health should be considered a charge against the industry. A similar decision has recently been made¹² by the Supreme Court of Wisconsin to the effect that medical and surgical treatment of injured employees as contemplated under the Workmen's Compensation Act of the state is neither a charity nor a penalty, but "a recognition of the economic truth that such expense is a legitimate element in the cost of production and should be placed upon the product as directly as practicable." We are therefore already at the point of social development where the maintenance of health of its workers is recognized as a just charge against an industry. The question of further development along this line is not primarily a question of laws but a question of education requiring the services of experts in research and publicity.

Many of our cities are coming to realize the necessity of such a department in the city government, in order that progress may be made along all social lines, health included. In the new Cleveland charter, adopted a year ago under the Department of Public Welfare, there is provided a Division of Publicity and Research.¹³ The scope of the provision is easily seen. It says:

Section 98. The commissioner of publicity and research shall provide for the study of and research into causes of poverty, delinquency, crime, disease and other similar problems in the community and shall by means of lectures, exhibits and in other proper ways promote the education and understanding of the community in those matters which concern the public health and welfare.

In the industries supervision of health conditions by a physician is essential, and this necessity is being recognized by many employers, who are voluntarily establishing welfare departments in their works.¹⁴ Several of the large concerns in Cleveland have had welfare departments established for some time. These are under the direction of a physician, generally the surgeon of the company, who is paid a salary not merely to take care of injuries but primarily to advise as to the health conditions under which the employees work. Usually there are associated with them one or more nurses whose duty it is to be constantly upon the ground and to see that conditions are as they should be.

This voluntary activity upon the part of employers could never have come about except through the force of circumstances and the agitation for laws governing health conditions instigated by the medical sociologist. Such welfare work has, too, a very intimate relation to the future of medical practice. This form of service is certain to increase, and the medical profession should be in a position to advise such systems whether for state or private activity as shall be equitable to all concerned from a financial as well as a humanitarian standpoint.

Nineteen states, California, Connecticut, Illinois, Iowa, Kansas, Massachusetts, Michigan, Minnesota, Nebraska, Nevada, New Hampshire, New Jersey, Ohio, Oregon, Rhode Island, Texas, Washington, West Virginia, Wisconsin, have passed and have in operation laws known as Workmen's Compensation Acts, which have for their object the care of the injured workmen as well as making awards for disability and death. Perhaps the best of these are those of California and Ohio, both in their provision for the interests of the employer and employee and their intent to deal fairly with the medical profession.

In California the state medical society is awake to the situation and is working out a method of coöperation between its competent county societies and the industrial commission such that the individual physician will be fairly compensated whether working for the commission or for some one of the independent accident insurance companies.¹⁵ In Ohio there has been considerable misunderstanding and friction, although the Act as passed is more favorable to the physician than that of any other state. This difficulty, it is hoped, will be eliminated through the activities of an advisory committee which has been appointed by the state society upon the request of the Governor of the state to coöperate with the Industrial Commission of Ohio. The operation of the Act will, we are sure, be much improved by subsequent experience.

It matters not whether the attitude of the profession is hostile toward what some may call socialistic and paternalistic activities on the part of the state, the profession may as well realize that this new development of communal activity has come to stay because it is an economic necessity. Where it is being

operated it is proving to be of distinct advantage to the injured workman and the employer. The Industrial Commission of Ohio, with less than a year and a half's existence, is caring for 100,000 cases a year. Whether communal activity is to be equitable to the physicians engaged directly or indirectly in the employment of the state depends upon the intelligence and diligence which the profession devotes to the solution of the problem.

We are all more or less acquainted with the industrial struggles of physicians abroad. More particularly do we hear of the unfortunate position of the German practitioner in relation to the sick societies. In our medical notes we constantly find mention of pending crisis between the German profession and its insurance societies. The situation in England is more recent. The Insurance Act effects 20,000 English physicians out of 22,500 who are in general practice. Our latest reports show that the benefit of the Act to the physician is still in debate. There seems to be evidence to show that the physicians who have thus become employees of the government have not suffered thereby, but rather are receiving more than previously from the same class of work. Surely we in America must not flatter ourselves that such problems as confront the English and German physicians will not confront us. The economic forces are the same and whether, when the issue arises, the medical profession shall receive proper recognition lies with the profession itself.

Whenever the question of industrial insurance is up, the attitude of the profession must be one of advice. At the same time its members should have the dignity to insist upon proper consideration and compensation under the law for the profession. Proper care of the men must mean capable physicians coöperating with the state, and they should be adequately paid. Nor can the funds of the state be properly protected unless the physicians are capable.

Proper awards to the men are assured through the activities of their organizations; equitable rates to the employer, through the activities of the employers associations; proper awards to the physician must in a large measure depend upon the attitude of the profession generally.

It is unfortunate that, in our professional activities in city,

county, and state, physicians have been unable to distinguish between private charity and public gratuity, and have allowed themselves to give alms to cities and governments generally, by doing work for inadequate returns. This condition of affairs can be remedied only by careful attention and endeavor. Superficially, the three elements, the employer, the employee and the physician seem to be at cross purposes with each other in the economic struggle—in fact they are and must be mutually interdependent. Tact and forbearance on all sides will be necessary in adjusting this newer phase in industrial life to the ethics and economics of the physician. The adjustment must be made, and whenever laws are projected affecting the health of the operatives in the industries they should be given careful consideration and study by the profession.

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XIX.

HAPPINESS AS A FACTOR IN EFFICIENCY.

By WOODS HUTCHINSON, A.M., M.D., New York.

I assure you that I appear before you on this occasion with a sense of presumption due to the fact that I am almost the only one who has no official right to speak as an expert—no title before his name; simply a representative of the country doctor and of the plain people. So, if my remarks are trite or my information already familiar, I hope you will overlook it.

The difficulty in our welfare work is that we take ourselves too seriously—too blank seriously as they say in the West. If we would introduce pleasure into our scheme of life I believe our work would be more efficient and our plans more likely to be adopted. It is all well enuf to inform the laity how they ought to live and how much better off they will be if they live on 11 c. a day than \$1.10—which is what most of us live on. Considerations of that kind do not arouse much enthusiasm in the breasts of the persons for whom they are intended. I merely want to put forward the good side of happiness and see to what extent we can increase the happiness of every individual in the community and particularly of the great mass of the people. They are the ones who are not represented and have no say in most of these discussions, and who carry 90 per cent of the work and burden of the day. We are inclined to forget, in talking of the workers, that most of us are in the position of not having to do manual labor for our bread. Kipling's fine hymn to labor describes the widely different fortunes of us upper class "Sons of Mary" and the worker "Sons of Martha:"

"We have cast our burden upon the Lord
And the Lord he has laid it on Martha's Sons."

The question then is that of the happiness of the worker and of the whole community. In the first place, happiness is of great value as an index. If we watch carefully the faces of workers in a factory we have a means more sensitiv than tests of air, humidity and temperature, of telling whether or not the factory

is being run under wholesome conditions. If the men, women and children at work do not look happy, it is a good place to make an investigation. We find a parallel in the utilization of canaries and mice in submarines. The moment they begin to chirp and squeal we give attention to the gases in the air. Like the dear old nurse, who when asked whether she used a thermometer in the baby's bath, replied, "Of course not, I just put the baby in, if the water is too hot, he turns red; if too cold, he turns blue; and then I know what to do."

What do we mean by happiness? That mental condition which accompanies perfect physical health. Those things necessary to make a person happy are those that make for vigor and efficiency. As we follow out the normal impulses of the healthy human being, I believe we shall find this to be an accurate statement of the case.

Eating is our favorite indoor sport. The good old lady who was asked what she had enjoyed most in her 90 years of life, replied promptly: "My vittles."

Dr. Bulkley referred to the tendency among the poor to buy early fruit rather than articles of the greater food values. If some of us had to live on the diet all thru the winter that the members of the industrial class do, we would begin to have a craving for something new in the spring. The mere matter of an adequate number of calories is not enough. The food must be of such a character as to appeal to our appetite and to satisfy our demand for variety and our absolute hatred of monotony. Diet may be ideal from a laboratory point of view and yet people cannot thrive and do their work on it. Increased efficiency and power to resist disease will follow adjustment of the diet upon these lines.

There was a time when we thought something was wrong if we were too happy. We are getting past that and into the position of trying to get everybody into the work for which he is best prepared. Some one has spoken of the psychology of fitting people to the occupation to which they are best adapted. When a man is doing work easily and doing it well, he is, nine times out of ten, happy. In carefully adjusting the nature of the individual to the character of the work, we are promoting happiness and

efficiency. This question should carry us outside of that of food, housing or of occupation. Lack of daylight, objectionable fumes, dust and heat make for inefficiency and discomfort in the same degree as do the reverse for efficiency and happiness. The more nearly we make the surroundings contribute to the worker's happiness the more nearly we attain economic efficiency. I think the more we approach the matter from this viewpoint and meet the worker more than half-way, the more will he respect our philosophy.

One of the most important factors in the happiness of the individual is the size of his wages. We should use our influence to ensure that men shall receive enuf above their absolute needs to be spent in increasing their health and vigor. I believe we should go outside of the factory and the conditions under which work is done, and provide for wholesome, rational methods of recreation and happiness in the hours of rest. What a man does in his hours of play is not only an index of, but has more to do with, his moral status than what he does in his hours of work.

Quite unintentionally on our part, we have crowded ourselves and our houses together and occupied every available foot of space until there is no room left for the people to play. Dr. Davis spoke of the child who had to go before the Juvenile Court and be sent out to its farm before he found a place where he might throw a stone as far as he could or yell as loud as he wanted to. That is the sort of condition we have produced in our cities. We have so crowded conditions that we cannot let ourselves loose.

Our scientific efficiency plans provide now for recreation centers, concert halls, etc., in connection with our industries. This ought to be made a part of our municipal system. There should be provided places where the young could meet those of their own age under desirable and wholesome conditions. To provide proper places for courtship is one of the functions that should be taken into account and one of the most vital. Instead of the highways and hedges or the dance hall under objectionable circumstances, there should be wholesome provision for the young people to become acquainted with their life partners, and to come together for this most important purpose. That which

strikes me as a most admirable institution of the Latin civilizations is the great public central plaza, which every little town has, to which everybody goes after dark, and where the people move about or sit at little tables or dance. The main thing is to walk round and round and see and talk to people. The most interesting thing in the world is people, just people. If we could introduce something of this sort into our cities and towns, I believe it would do more than almost anything else to reduce social disease, immorality and inefficiency. The amusement question is one of the most vital. I believe the two things that have done most in the last 15 years to raise the moral standard of the youth of our country are the "movies" and the tango. I believe the "movies" should be installed in every school house and in every church. If we will give heed to the amusements of the community we shall do more than by almost any other means to improve the health, raise the moral tone and increase the happiness of the people.

XX.

INDUSTRIAL INJURIES: TREATMENT.

By W. L. ESTES, A.M., M.D., Director and Physician and Surgeon-in-Chief of St. Luke's Hospital, So. Bethlehem, Pa.

The Employers' Liability Acts which have been passed in twenty-four states¹ and the dictates of Industrial Commissions in many other states, have finally brought industrial establishments to a very general installation, and the enforced use, of safety measures and devices.

Sporadically, so to speak, American manufacturing establishments, for a number of years, tried to profit by the remarkable results accomplished, especially by the German establishments, and adopted many of the devices shown in the foreign commercial museum exhibits, but their well intended efforts were in most instances frustrated by the employees themselves, who refused or neglected to use the safety devices placed about their machines.

Now that the statute law requires protection and holds the employers responsible for the safety of their work people, these safety devices are generally installed and their use by the employees is required.

The report of the United States Steel Corporation for the last fiscal year, states:

Our Accident Prevention Work has reached a high point of efficiency. Nevertheless, experience and careful observation suggest improvements from time to time and they are promptly made. Effort is now being directed toward teaching the workmen habits of caution, making watchfulness against dangers to themselves and their fellows a matter of constant attention. It has been necessary to overcome recklessness and disregard of dangers which had come to be treated as customary risks of the trade against which the men would not take any precautions, to teach them that taking risks will not be permitted.

The cost of safety work in 1913 was \$660,593.00.

Serious accidents per 1000 employees are now $38\frac{1}{4}$ per cent. less than in 1906, when this work was first taken up by the corporation. This means that 2,273 men, who might have been injured under earlier conditions, were saved from serious injury during the year.²

It is evident that industrial accidents are many fewer and they

are likely still to be reduced as experience and the law requirements shall be further enforced.

Notwithstanding all these measures of care and protection human beings suffer so many lapses of attention and responsibility that there must always be expected in the United States a large number of injuries in the large number of establishments crowded with intricate machinery driven at ever-increasing speed. Systematized efforts to prevent injuries must apply not only to safety devices to protect the operatives from the machines themselves, but also to the disposition of the operatives' hours of work, to their physical conditions, and to their habits.

PREVENTION OF ACCIDENTS BY RULES FOR THE PERSONNEL OF THE EMPLOYEES.

(a) *Hours of Continuous Labor.*—It is a well attested fact that serious accidents are much more apt to occur to an individual workman when his perceptive faculties and his alacrity are blunted and delayed by weariness. The majority of serious accidents therefore naturally occur during the last hours of a man's work, or when he has by sleeplessness or worry or both combined markedly exhausted himself.

Prolonged periods of labor should on this account not be permitted or required of men working about dangerous machines.

Naturally the danger is greatly multiplied when a large number of men do overtime machine work, or have unreasonably long periods of labor required of them.

To quote again from the report of the United States Steel Corporation (this corporation employs the largest aggregate number of workers in the United States, hence observations, experiences and conclusions from this corporation ought to be especially applicable and valuable):

From our investigations of the subject, it is believed that the twelve-hour day is not physically detrimental to the men, because the work is intermittent, and for the further reason that the introduction of machinery has eliminated most of the arduous physical labor. In fact, those departments in which the eight-hour day prevails are probably more exhausting in their demands upon the men physically than the twelve-hour shifts, owing to the continuous nature of the employment.²

Certainly not more than twelve hours a day for intermitting labor and not more than eight hours for persistent labor seems right in order to conserve the wide-awake attention and care which is required to prevent accidents.

(b) *Physical Examinations Should Be Required of Employees Who Manage Dangerous Machinery.*—For many years railroads have recognized the necessity of physical examinations to prevent the employment of and to weed out unfit employees. This seems almost equally necessary and proper in regard to other industrial occupations which are hazardous, especially when dangerous machines may be managed by physically unfit persons.

Not so much color blindness but defects in refraction and accommodation in the eyes of employees may serve to make them unfit to manage or to be about dangerous machines.

Serious heart lesions which may readily bring about syncope, or any organic ailment of a persistent and serious nature which may suddenly reduce the individual to helplessness, should absolutely disqualify a man for employment about dangerous machines. Persons subject to epileptic seizures, or those who may give way to hysterical attacks, have no place about dangerous machines.

Men addicted to alcohol, who either daily or at longer intervals use alcohol to excess, should not be employed about dangerous machines. A little while ago, an intelligent leader among a community of Slavs, told me, the men are accustomed to drink alcohol and the cheapest commercial alcohol, too (denatured spirits). Besides the mental and moral injury inflicted these men soon have their stomachs inflamed and in a short time they are practically wrecks physically, and absolutely unreliable mentally.

It is remarkable that industrial establishments have not yet been convinced that tremendous gain in efficiency would result if their employees were selected by careful physical examination by a competent person and the unfit weeded out.

Perhaps the necessity of safeguarding what has hitherto been so cheap in this country but which is becoming commercially and legally of some small account, *human life*, will induce managers

of industrial establishments to appreciate the normal human beings of good habits at their proper value as preventers of accidents and conservers of other human lives.

(c) *Treatment of Injuries.*—1. *First aid:* Modern enlightenment should require in every large industrial establishment that at least a number of the superior employees shall have received good training in elementary first aid work, and the theory of infection of wounds, and the measures to prevent infection.

These foremen should be named and be regularly appointed as the heads of the first aid department in the works.

In a large establishment each shop or department should be equipped with a well selected kit for first aid, and should have a regular dressing station, of easy access, but protected from the dust and grime of the mill. The foreman designated as first aid man in each department should have charge of this dressing station and should render first aid to all injuries in his department. Each large establishment should be provided with proper stretchers and if it is necessary to transport injured men any distance it should have one or more ambulances. It is far better for the mills to have their own ambulances than to trust to an ambulance from even a near-by hospital, for the service will be much quicker, and with a trained attendant for the ambulance, and trained first aid dressers, the service will be equally, if not more, efficient.

2. *Permanent treatment:* Serious injuries should as soon as practicable be transported to a good hospital and receive permanent treatment as required by modern methods.

It is hardly necessary for this paper to enter into any discussion of the vexed question of hospitals conducted by the mills, or whether it is best for mills to send their injured people to a general hospital not under the direction and control of the mills.

When there is no good hospital in the community unquestionably the mills should provide one for the proper treatment of its employees. General hospitals in a community may readily obtain the services of one or more of the best surgeons in the community. Some of the best men, however, would hesitate to accept the position of contract surgeon of an industrial establishment.

Where the wards and facilities of a well equipped, first-class, general hospital, situated not too far away, may be had, it is best both in the interests of the patient and the mill to send the injured employees to this hospital. Unquestionably, too, the mill should pay the hospital a proper daily per capita remuneration for this service.

The sociologic effect of the two kinds of hospitals are matters of no small account. This phase of the question cannot fully be discussed, but some points ought to be mentioned.

An industrial establishment which owns and manages a hospital naturally directs not only the economic affairs of the institution, but manages the essential features of the treatment, by furnishing or not furnishing the best up-to-date equipment for operations and after-treatment.

The prevalent atmosphere of these institutions is apt to be commercial and may lack the desirable humane considerations which should prevail in a hospital. Daily per capita cost is apt to stand ahead of annual efficiency in restoring life and limb.

Industrial hospitals, too, restrict the educational advantages of the staff and of a community which should belong to a good hospital; "the material" is not available for clinical study and exhibition except for a very few men. Thus the hospital loses a double stimulus for advancement of method and improvement of technique, namely, the incentive of teachers and leaders, and the prickling up of intelligent thoughtful inquiry and doubt of the pupils. The physicians of the community are not at liberty, nor can the surgeon in charge freely invite his colleagues to avail themselves of the clinics and operations.

Well taken and carefully recorded notes should be preserved, indexed and filed in the hospital, also a well devised "follow up" system should be employed in every hospital, in order to establish the values of certain lines of treatment, methods of procedure or operations, and to standardize proper results of treatment. In this way the officers of the hospital and those of the mill would know whether or not a proper measure of efficiency was obtained by the surgeons in the hospital, and the surgeons could compare

their results with those of other hospitals for their own encouragement or stimulation.

Results could be standardized so that medico-legal investigations might have reliable data upon which to base conclusions as to degree and time of disability which ought to follow as a proper result from all the ordinary injuries.

By this system speculative suits would be very much less frequent, and the just demands of the permanently incapacitated man would be much more apt to receive early and adequate recognition.

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XXI.

THE RELATION OF THE MEDICAL PROFESSION TO THE WORKMEN'S COMPENSATION ACTS IN THE UNITED STATES.

By FREDERICK L. VAN SICKLE, M.D., Olyphant, Pa.

The evolution that has taken place in the industrial world in the past twenty years has brought about many changes in industrial conditions, in conservation of the laboring classes, in relation to their health, sanitation and general welfare, owing to a better realization of the monetary value of human life and health, to industry.

This evolution has rapidly changed the laws of European countries and has invaded the United States in rapid succession.

BRIEF HISTORY OF WORKMEN'S COMPENSATION ACTS.

In the 4th special report of the Commission of Labor, issued in 1893, under the title of "Compulsory Insurance in Germany," was the first report published in this country on the subject of workman's insurance. At that time compensation for industrial accidents had been established by law in two countries only—Germany in 1884 and Austria in 1887, the third country, Norway, not following until 1894.

Since the publication of this first report, the development of the legislation providing for workmen's compensation for industrial accidents in Europe and throughout the world has been extremely rapid; in fact, it may be doubted whether any subject of labor legislation has ever made such rapid progress or gained so general an acceptance for its principles throughout the world in so brief a period. Legislative summaries show that forty-one foreign countries (including all European countries, except Turkey) have introduced some form of workmen's compensation for industrial accidents, all of which, while showing great variations in the industries, cover the amount of compensation provided and the methods by which compensation payments are secured, recognize the principles of compensation as distinguished from the older idea of employers' liability, previously accepted in the

civil law of Continental Europe, as well as in English and American law.

In the United States what might be called the period of investigation and education began somewhat late as compared with European countries, but since that beginning, investigation and study have been followed by legislative action with great rapidity.

The first American state commissions were appointed in New York, Wisconsin and Minnesota in 1909, and legislation followed in New York in 1910, in Wisconsin in 1911 and Minnesota in 1913. Within this period, beginning with 1903, 27 commissions, not including one federal commission, have been appointed to consider the subject of compensation and compensation legislation has been enacted in 23 states.

With this remarkable development of compensation legislation in the United States and throughout the world within so short a period, it would seem especially desirable, to study and compare the various provisions already in force, to serve as a guide to new or amendatory legislation.

It became evident in the United States some years ago that the old employers' liability system was inadequate and wasteful to a degree and wholly unsuited to the present industrial conditions. As a result, some safe and sane method of distributing assistance to injured workmen was established through commissions in each state and the introduction of workmen's compensation acts, which dealt more favorably with the question at issue.

The United States Bureau of Labor, in Bulletin No. 78, estimates the total mortality from accidents, in the United States among adult wage earners, to be between 30,000 and 35,000 annually, and the non-fatal accidents, half of which occur in industrial establishments, to be approximately 2,000,000 each year. This waste of human life, misery and hardship which follow the maiming and disabling of wage earners, injured while in pursuit of their trades and callings and for which under the old liability laws only a small percentage received any compensation whatever, constituted an indictment against our civilization and which these new compensation acts seek to remedy.

The fundamental principle both in Europe and in the United

States is that the expense of injuries incidental to modern industry should be treated as a part of the cost of production, workmen to be compensated for industrial accidents, not as in prior conditions on the basis of the liability of the employer, but on the fact of injury. The desired result is that prompt and reasonable compensation is insured to all injured workmen and the only exceptions being such cases as are caused by serious and wilful misconduct of the workmen themselves.

Liability acts under the common law defense were that the employee was negligent; that the injury was caused by the negligence of a fellow-employee, or that the employee had assumed the risk of the injury—any or all of which unjustly kept the injured workman from recovering damages, and which were abolished by the introduction of workmen's compensation acts.

Under these new laws the employee comes automatically within its provisions, unless he gives notice to his employer that he elects to stand upon his common law rights, in which case his employer continues to be fully protected by the common law, and the injured workman recovers damages only through delay and uncertainty of the courts. If the employer elects not to come under these new acts, the injured employee has the right to proceed against him with these three common law defenses, previously available, removed, and with the possibility of the injured employee collecting heavy damages, the sole question in such proceedings being the negligence of the employer.

THE RELATIVE VALUE OF SUCH PROVISIONS TO THE WORKMEN OF THE STATES. WILL "SAFETY FIRST" BE IMPROVED?

The relative value of such provisions, as workmen's compensation acts, to the workmen of the United States, have depended and will depend much upon the equity and fairness with which they are framed and applied. The demands for these laws do not come from employees alone, for wage earners have been very slow in times past to protect themselves, either by insurance or through a demand for compensation after injury.

Employers also recognize the real need for laws which would not only give reasonable compensation to the injured workman

but would tend ultimately to bring about the adoption of safety devices, which would reduce substantially such injuries, and the corporations, many of which have, previous to this law, provided such compensation without enforcement, have been of material assistance in aiding legislation in the several states of our country.

One of the greatest organizations of manufacturers in the country in national convention recently adopted regulations which declared:

"That the present system of determining employers' liability is unsatisfactory, wholly wasteful, slow in operation, antagonistic to harmonious relations between employers and wage workers," and that some effective means of automatically providing relief for the victims of industrial accidents and their dependents should be provided in order that waste might be eliminated, litigation and friction reduced to their minimum and the requirements of justice conserved.

Wisconsin in its introduction of its workmen's compensation act of 1913, says:

The objects of the Compensation Act are as follows: 1st, To furnish certain prompt and reasonable compensation to the injured employee; 2nd, To utilize for injured employees a large portion of the amount of money wasted in the present liability system; 3rd, To provide a tribunal where disputes between employers and employees in regard to compensation may be settled promptly, cheaply and summarily; 4th, To provide means of minimizing the number of accidents in industrial pursuits.

The present slogan in all the industrial world is "SAFETY FIRST," and it would seem from the study of compensation acts that perforce, manufacturers, mine and mill owners, industrial corporations and all interested in the great problems of manufacturing and industrial life, would seek greater safety for those who are the life blood of their industries—their workmen.

It has been shown in the reports of several of the states, in the short time they have been operating these legal measures, that the number of accidents has been reduced, that the severity of the injuries has been somewhat mitigated, and that further improvement will be as rapid as is the introduction of compensation laws in the remaining states of our Union, where they have not been adopted.

In the report of the Illinois Commission, which was prepared prior to the introduction of the compensation law in the legislature, they make the following statement:

The state of the mining industry, one of the largest industries of the state, leads the commission to the conclusion that the adoption of the scheme of compensation would affect a change of but 1.6 cents per ton of coal mined, to meet the necessary expenditures. As to the direction of this expense, it is said—should this prompt the exercise of extra care, as the commission confidently anticipates, only a portion of this increase would be utilized for the purpose of compensation, the remainder going into the plant in additional safeguards and conveniences.

It can readily be seen by this comment of the commission, that legislation aimed to protect workmen would aid materially in causing manufacturers, coal-mining industries and the like, to make their plants as safe as human invention can make them, thereby minimizing the number of avoidable accidents due to unprotected machinery, carelessness of fellow-workmen about unprotected places, and the more strict enforcement of rules and regulations whereby accidents may be avoided.

THE APPARENT DISSIMILARITY IN THE PROVISIONS AS FOUND IN THE DIFFERENT STATES.

The dissimilarity in the provisions as found in the different states now having compensation laws has been commented upon by commissions appointed to investigate the laws and to make reports to legislatures in states not having adopted such measures.

The commission in Colorado made no attempt to draft a law, inasmuch as the examination made of the statutes of the other states, showed such wide divergence, that no conclusion was reached as to the type to be recognized. The commission was impressed with the importance of uniformity of legislation on the subject, but felt that none of the existing state laws were adopted to the industrial conditions of Colorado.

It was agreed that a compensation law should be enacted and that it should be applicable to all productive employments, and that there should be some plan by which compensation payments would be guaranteed. It was recommended that more

study and investigation be given to the subject before any bill was drafted, reference being made to the fact that all laws of this type are of recent enactment in this country and that it took 16 years to unify the laws of Germany on the subject.

From a table compiled by the Commission of Labor Statistics, Senate Document No. 336, December 23, 1913, we find the following comparisons of workmen's compensation insurance, as per table hereto attached.

An inspection of the tables above referred to, discloses considerable diversity in the matter of systems adopted, whether compensation or insurance, compulsory or elective; if insurance, whether under state control or with approved companies, and whether at the sole cost of employer or coöperative. The majority of states elect that the employer shall stand the cost of the compensation. The industries covered find most of domestic and agricultural labor excluded, while some only designate classes of extra hazardous employment. Most of the industries specify that where machinery is employed and that where more than five workmen are on the pay-roll, a compensation must be granted.

In the system of compensation as to whether acceptance of the system or rejection of the same, we find that this ranges from an individual filing of such workmen of an acknowledged writing, as in the elective law of New York State, or in the absence of formal rejection, as in a number of other states.

In the abrogation of defense under the elective system in most states, it is made an inducement, which has been criticized as coercitive, that where employers refuse to come within the provisions of the compensation law the customary defense to action for injuries shall not be allowed them. In most cases the provision is made an alternative one. In some cases the law applies only to employers having an excess of a certain number of employees. The abrogation of these defenses does not affect the employers of a smaller number of employees. The same is true also in cases in which the employee rejects the compensation system and sues an employer who has accepted such a system.

The importance of guaranteeing payments has been recognized even more widely than any other provision that has been

made. Aside from the guarantees and preferences, as indicated in the table, compensation payments are usually exempt from execution and are not assignable when in the hands of the beneficiary.

The necessity of more provision of this sort, apparent on the face of things, is borne out by the report on the operations under the statutes of New Jersey, in which it is reported that in a number of cases the benefits due workmen were not paid to them.

A very important item in the comparison of laws, comment upon which has been made by many of the state journals in states where compensation laws exist, is *Waiting Time*. Most of the laws fix a time during which no compensation is payable immediately following the accident causing disability. This ranges from 6 days to 2 weeks, and for this time no compensation is allowed in most states other than such provision as is made for medical and surgical attendance, and in many of the states, no reference is made to medical and surgical attendance. In a few cases, however, if the disability is prolonged beyond a designated time, benefits are payable for the first week or weeks of disability. The federal statute allows no compensation for an injury not continued beyond 15 days, but where the injury continues, payment is made from the first day. This results in the denial of all compensation for disability lasting as long as 14 or 15 days, but allows 16 days full pay for a disability of a day or portion of a day beyond the waiting time fixed.

There may be a variety of reasons for these differences, but there is ground at least for a belief that the difficulty in enforcing a return to work under circumstances that would forfeit all compensation when the prolongation of the disability, whether with or without serious extension of a proper time for recovery, allows the injured workman to secure full pay for all the time lost, is effective.

There is a rather wide divergence in the amount of compensation allowed in the different states, which in all probability arises from the fact that conditions of wages, of the class of work, and the principles of equitable payment have entered into the construction of the laws in different states, and a wide discussion

has ensued as to the best method of awarding compensation. This is arranged in three classes: (1) for death; (2) for total disability; and (3) for partial disability.

In some states, in addition to the payment for loss of time and injury, provision is made for medical, surgical, hospital and nurse attendance, and in a large number of cases for burial in case of fatal injuries, as well.

The necessity for a law, not excessively burdensome to the employer and not unduly tempting the prolongation of benefits, and which affords reasonable benefits to the injured workman, so as to prevent hardships of dependents and loss of the family wage earners, is desirable—all of which have led to a wide variety of attempts to determine the proper amounts to be awarded. It has been said that "the scale, so far as possible, should divide the wage loss sustained by the employees and their dependents, equally between them and their employers."

We observe that this is both impossible and undesirable, as the contention has been sustained in that the industries should bear the burden of expense. Neither is it tenable or desirable to compensate for injuries by full rate of pay. Yet it must not be forgotten, as was considered under the common law defense, to take into consideration the pain, suffering, inconvenience and extra expense borne by injured workmen and their families, upon which no money value can be set.

The provision for benefits for death, based on the earnings of the injured person in most cases, usually approximating 3 or 4 years' wages, is payable in installments ranging from 50 per cent. to $60\frac{2}{3}$ per cent. of the weekly wages. Minimum and maximum amounts for weekly payments and for the total, in most states are allowed. Children who are beneficiaries usually have the benefits payable in their behalf cease on their reaching the age of 16. In a few cases the limit is 18 years. A few states have the provision also that benefits shall not cease at the ages named, if the recipient is physically or mentally incapacitated from earning a living. The re-marriage of a widow terminates the benefits in a number of instances, although in a few a lump sum is payable on re-marriage. If the beneficiary is a widower, no

provision is made for a similar allowance in case of re-marriage.

The question of permanent disability has always been a very difficult one to decide and some states recognize the fact that a permanently disabled workman is a greater economical loss to his family than if he were killed outright at the time of the accident, and allow in case of permanent disability a larger amount of compensation than in cases of fatal accidents, some continuing payment for the full period of the injured workman's life. In every state law, provision is made for continuing partial disability, often by a percentage of the wage loss occasioned by such disability, while in a number of states there is a scale fixed by law awarding weekly payments for fixed periods after specified injuries, the payments being based on the amount of wages earned at the time of the injury.

It is noted that in the legislation of the year 1913, the system of providing a scale of fixed rates for specified injuries seems to have been in favor, and that in amendments to earlier laws such schedules were adopted in lieu of the percentage provisions contained therein.

The schedules of periods of compensation adopted in the various states include generally the same items, and it is possible to tabulate them so as to afford a comparison of the awards allowed by the different states for specified injuries. In most cases, compensation is to be continued for a fixed number of weeks, while in a few instances the term is measured by months.

From investigation as to the dissimilarity of the various acts of states now having compensation law and their awards, we observe it was necessary to prepare tables of disability, which differ largely as to compensation, owing to the short time in which they have been in operation in the United States.

It is apparently difficult to compare statistics between American and European scales, owing to the fact that European countries have had in operation in some form, compensation laws for a much greater length of time than has prevailed in the United States. The tables as prepared by the Bureau of Labor Statistics give computed percentages of disability for specified injuries and are based

on the schedule of compensation awards under the laws of various states.

In this we find that we have the nature of injuries, loss of arm, hand, thumb, foot, leg, etc., and a percentage rate as to the award for such injuries. In this table we see a great divergence from any specified standard, and also from a comparison of these tables and those of foreign countries, it is apparent that a greater award is paid in most of the foreign countries than pertains in the United States.

Injuries to the eye have received comparatively little attention in American laws, decrease of visual incapacity being noted in but one statute, while in European practice, compensation laws have been arranged in Russia and Germany computing the decrease of disability due to the weakening of the eyesight.

While many of the distinctions presented in these tables are far more elaborate than any yet in force, the development of a system of compensation awards will necessarily involve the use of schedules for the guidance of administrators of compensation laws.

California probably has a more complete system of worked-out scale of percentage of compensation for physical disability, resulting from injuries, than any of the states. In many of the states, but little is said regarding such specified forms.

Time for notice and claim for disability is noted in the various laws, and limitations are placed on the time for giving notice from 10 to 30 days, and the time limit for a claim for injuries is from 6 months to 2 years. The time for presenting a claim or bringing action thereon appears usually to be fixed absolutely in all the states.

The method of settling disputes that arise owing to disability and an award for injuries in most cases is left for arbitration. In a large number of states a special commission or board is created to have charge of the administration of the law, and if an insurance law, of funds collected under it. In other states arbitrators are chosen for the purpose, or any standing committee of employer or his workmen may take cognizance of disputes, while in some states the disputes are referred to the courts. In

all cases an appeal, sometimes only on certain phases of questions involved, may be referred to the courts. Where the courts are charged with the settlement of disputes, it may be provided that proceedings shall be summary or that juries may be dispensed with in such cases.

THE NEED OF CODIFICATION OF THESE ACTS, FOR THE BENEFIT OF STATES PROPOSING TO PASS SIMILAR LAWS.

We observe from this investigation that out of the total number of states in the Union, but 23 have in operation or will have by July 1, 1914, laws pertaining to workmen's compensation, and it can be readily understood that from this dissimilarity of provisions in the states now having such laws, there is a need of codification of these various acts and a joint effort on the part of commissions to aid states proposing to pass similar laws in getting them as near uniform as it is possible to do.

We might refer with profit to the experience of a stock insurance company, a report of which was submitted to the Industrial Department of the State of New York, and which shows that the laws of some of the states are indefinite and uncertain as to the amount of compensation to be paid and in what cases it should be paid. In order to determine its liability the company is required in some cases to appeal to an arbitration board or a state industrial board. When the liability of the company is determined, the benefits are promptly paid. Any delay in making settlements of disputes that have arisen can in practically all cases be blamed on the failure of the laws of the various states to clearly prescribe the amount of benefits due the workman, and further many of the laws do not prescribe the method to be adopted in computing the amount to be paid in a lump sum settlement. All such settlements must be approved either by a court or by an industrial accident board, and where such settlements have been made, the proper procedure has been taken.

We find that compensation claims, especially those where any dispute arises as to the amount, are settled much more expeditiously and satisfactorily in states which have industrial accident boards, whose duty it is to approve the claim settle-

ments. It is the function of members of such boards to determine the amount due under the compensation law and to issue rulings as to their interpretation of its provisions; as members of the industrial accident boards devote all their time to the subject of workmen's compensation, it is evident that the ruling of such a board is of more value than that of an arbitration board selected promiscuously. As the injured workman selects one arbitrator and the assured another, these two selecting a third, it devolves upon such third member in most cases to decide the disputed question. It is also true that in but few instances, if any, does the same arbitration board act. It is believed that in all states there should be one board or authority which will make uniform interpretation of disputed questions arising under the law. It can readily be seen that otherwise the insurance companies or arbitration boards will make different decisions as to the benefits to be paid on claims arising under the same provisions of the law and a similar state of facts.

We might further multiply the points of dissimilarity in the various laws of the states, but for our present purpose it is sufficient to say that amendments to the laws having been made within the past five years indicate that a nearer solution of the problem is being made, and that the amount of information now available seems sufficient to warrant the preparation of an adequate law to meet any industrial condition. The amount of litigation that has reached the courts of last resort, indicates the importance of careful wording and full provision to carry out the intentions of legislatures in states where laws are not in force.

It might be said that we of the States are not the only ones having difficulty regarding the workmen's compensation acts, as reference to an editorial in the *New York Medical Journal*, May 23, 1914, which states: "That the bill now before the Ontario (Canada) legislature as to its liability to make compensation to its employees for injuries received during employment, is in its entirety, just, neither to the Province or to the profession of medicine. Employers of labor are to be assessed on the wage percentage basis to provide for an accident fund. The act does not make provision for payment of surgical and medical

care, like similar acts of other countries, and the medical men in Ontario object to its adoption."

It is suggested in this editorial, that physicians in the United States should watch the progress of this bill among their neighbors and follow their good example in interesting themselves in this matter of compensation for injury and to let them see that all state legislation bearing on the subject makes full provision for the payment by the employer of all reasonable medical and surgical fees.

THE RESULT OF THE APPLICATION OF THESE ACTS TO THE MEDICAL PROFESSION.

The relationship of the application of the laws pertaining to workmen's compensation in states now having them in force and in states in which they will subsequently become enforced, is very close to the medical profession. Every case of injury or disability occurring under the provisions of these acts must, of necessity, receive the attention of some physician, and a careful discussion of the relative merits of these acts in relation to our profession will be of material advantage.

We find in analyzing the provisions in the several states now having compensation acts, the same dissimilarity as in other portions of their provisions. For instance, out of the 23 states, we find a wide application of medical and surgical provision. One state gives medical and surgical aid for one week; five for two weeks; one for thirty days; one for eight weeks; three for three weeks; one for sixty days; three for ninety days; six do not pay except upon decease of employee leaving no dependents; two make no provision; one gives reasonable service; one pays to the limit of \$150; one pays to the limit of \$200; one pays to the limit of \$250. For medical examinations of employees at request of company \$5 to \$10 is allowed.

In many of the states, fee-bills have been introduced, which give a list of operations and subsequent hospital, home or office attention. In this also, we find a variety of dissimilarity.

The question of fee-bills and remuneration to physicians, from the medical aspect of workmen's compensation, has been

the greatest bone of contention in states now having this measure in operation. It is, no doubt, no more difficult of application than is the operation of the fee-bill in any county of any state, where men of our profession have divergent views upon the question of what the public should pay for their services.

This same discussion upon the fees for services to injured workmen brings no greater difficulty to our minds, than what we have passed through in the various states, with our effort to create uniformity of fee-bills.

California and Ohio have discussed this question more fully than other states, and it seems that some profit might be gotten in considering the opinions of men from these states.

In the *California State Journal* of May, 1914, in discussion of the fee-schedule, we find the following, relative to the fee-bill as presented by the Industrial Commission. It says:

The fee-schedule is not a schedule of flat fees for all cases. It is a list of minimum fees appropriate for workmen earning not over \$1000 a year.

It does not cover everything; special cases need special consideration.

It is not put out as a contract of flat fees for which physicians must treat everybody injured.

The total amount received by our members per year will be very much more than what they get now.

In the California law, the employer has the right to call or designate what physician shall treat the injured person. When the employer has insurance, this right is transferable to the insurance company. The patient has nothing to say about it.

The commission has very wide power to adjust difficulties and differences that may arise, and it is admitted, unofficially, that possibly in some instances the patient may be permitted to have something to say in the matter of his physician.

The commission states: "That the vast majority of accidents are trivial and that the employed or injured person is not kept from his work for more than two weeks. For this reason no compensation will be allowed for that period of time and unlimited medical or surgical attendance may be provided.

"The amount to be paid to physicians for their work should be commensurate with the income of the injured person; that the charge should be what ordinarily would be charged by the doctor

if the patient had to pay the bill himself and not have it paid by the employer or the insurance company."

We now come to the more serious part of the fee-bill, *viz.*, *contract form of work*. In California, many physicians have been asked to sign a blank contract form, agreeing to accept the fee-schedule and undertake to do the accident work for the company, at their terms.

The State Insurance Department did not take this course of action and has not asked the physician to sign any such contract. They intimate that the fees which the state will pay, will be, in most cases, higher than those indicated by the insurance companies. Space will not permit of the introduction of these fee-bills, but a few items will give us sufficient data for discussion:

Fractures.

Femur or humerus, reduction and first dressing.....	\$25
Clavical or scapula.....	15
Fore-arm or leg—1 bone.....	10
Fore-arm or leg—2 bones.....	25
Patella.....	15

Compound Fractures. 50 per cent. additional to operation.

Dislocations.

Easy, without anesthetic.....	5
Hip.....	10

Operations,

Hernia, radical operation.....	30
Amputation of finger or toe.....	5
Fore-arm or arm.....	25
Knee or thigh.....	40

Assisting at Operations.

Major.....	10
Minor.....	5
Administering anesthetic.....	5

The real objection as presented to the law in most states is the inelasticity of the fee-bill, and that where minimum fee-bills are given, the minimum will also be the maximum.

It is contended by friends of compensation acts that consideration should be taken of the fact that where states, through state commissions or insurance companies agree to fees of physicians,

these physicians are paid in entirety, while it is our general experience in surgical work that many fees so earned are never received in general practice.

Besides the fees for operations, the fee for visit of \$1.50 and office \$1.00 would absolutely compensate in a great majority of cases in proportion to what is ordinarily received in general practice.

Bearing upon the question of fees, it has been stated that there is nothing in compensation laws to prevent the injured person from suing the surgeon for alleged malpractice, if he chooses, though he may not sue the employer.

In many of the states we find no plan has been adopted to pay for medical and surgical services directed by law. In some it is only upon the death of the patient that the physician receives compensation. In other states, for instance, Minnesota:

Medical and surgical treatment, medicine, medical and surgical supplies, crutches and apparatus as may be required at the time of the injury and thereafter during disability, not to exceed 90 days, to cure and relieve from the effect of the injury, the same are to be provided by the employer, and in case of his inability or refusal seasonably to do so, the employer to be liable for reasonable expense incurred by or on behalf of the employee in providing same, provided, however, the total liability under this Section shall not exceed the sum of \$100 in value, except that the Court may during said period of 90 days, upon necessity being shown therefor, require the employer to furnish such additional medical, surgical and hospital treatment and supplies as may be reasonable, which, together with any such sums or relief therefor furnished, shall not exceed in all \$200 in value.

Again we see in New Jersey:

During the first two weeks after the injury the employer shall furnish reasonable medical and hospital services as and when needed, not to exceed \$50 par value, unless the employee refuses to allow them to be furnished by the employer.

Ohio:

In addition to the compensation provided for herein, the Board shall disburse and pay from the State insurance fund such amounts for medical, nurse and hospital services and medicine as it may deem proper, not, however, in any instance to exceed the sum of \$200, and the Board shall have full power to adopt rules and regulations with respect to furnishing medical, nurse and hospital services and medicine to injured employees entitled thereto and for the payment thereof.

Oregon:

The Commission shall have authority to provide under uniform rules and regulations, first aid to workmen who are entitled to benefits hereunder, together with transportation, medical and surgical attendance and hospital accommodations for injured workmen, at an expense not to exceed \$250 in any one case, and to contract therefor in its discretion.

Nebraska:

During the first twenty-one days after disability begins the employer shall be liable for reasonable medical and hospital services and medicines as and when needed, not, however, to exceed \$200 dollars in value, unless the employee refuses to allow them to be furnished by the employer; Provided, however, that where the injured employee refuses or neglects to avail himself of such medical or surgical treatment, the employer shall not be liable for any aggravation of such injury due to said neglect or refusal.

Texas:

During the first week of the injury, the Association shall furnish medical aid, hospital services and medicines when needed, and if it does not furnish them immediately as and when needed, it shall repay all sums reasonably paid or incurred for same, provided notice of injury shall be given to the said Association, and this provision requiring notice shall apply to all subsequent sections of this Act, providing for compensation.

Connecticut:

The employer shall provide a competent physician or surgeon to attend any injured employee during the 30 days immediately following the injury, as such injury may require, and in addition shall furnish such medical and surgical aid or hospital service during such 30 days as such physician or surgeon shall deem reasonable or necessary. In the event of the failure of the employer promptly to provide such physician or surgeon, or such medical or surgical or hospital services during any portion of such 30 days, the injured employee may provide such physician or surgeon or medical or surgical or hospital service at the expense of the employer, or at his option the injured employee may refuse the medical, surgical and hospital services provided by his employer and provide the same at his own expense. If it so appears to the Commissioner, that an injured employee has refused to accept and failed to provide such reasonable medical, surgical or hospital care, all rights of compensation under this Act shall be suspended during such refusal or failure. The pecuniary liability of the employer for the medical, surgical and hospital services herein required shall be limited to such charges as provided in the same community for similar treatment of injured persons of a like standard of living, when such injury is paid for by the injured persons.

West Virginia:

The Commission shall disburse and pay from the fund for such injury to such employees as may be entitled thereto hereunder, such amounts for medical, nurse and hospital services and medicines as it may deem proper, not, however, in any case to exceed the sum of \$150. In addition to such award to such employee, payment to be made to the employee or to the persons who may have furnished the service and supplies or to the persons who may have advanced payment for the same, as to the Commission shall seem proper; provided, however, that in case any injured employee be entitled under contract connected with his employment or elsewhere, to hospital or medical services without further charge to him, no payment shall be given out of the Workmen's Compensation fund for hospital or medical service.

We observe from these sections of the various acts, that a wide divergence of application is made, condensing in several instances not only the amount for medical and surgical services, but also for hospital treatment, medicines, medical and surgical supplies, crutches, apparatus and nursing, and in none of them does the total amount exceed the sum of \$250.

We also observe that in no act where a commission has charge or where the payment is derived from an insurance company, has the patient the right of selection as to his medical or surgical attention or his hospital.

What conclusion may we draw concerning the influence, benefits and possibilities to the profession of the states in the application of the law now in force, and what may we construe will be the future of medicine under the application of the workmen's compensation acts?

We are of the opinion that the principles laid down both in Europe and in states now having these laws, are of great advantage to the people for their good, and when properly applied are right and just.

It would seem to us that errors have occurred in the framing of bills passed by the legislatures of many states, in not getting closer to the medical profession of the states as to their opinion and advice, relative to that section of the acts pertaining to the application of medical, surgical and hospital service.

As has previously been stated, when injury occurs the first party called is the surgeon, and upon him will rest the greater

responsibility of conserving the finances of the corporation or the insurance company, who are to pay the awards when the time comes for final settlement.

One of the obstacles, no doubt, in the successful application of this portion of the act is political appointment of local examiners, and favoritism that must in most states apparently pollute an otherwise good and beneficial measure.

We believe in all states the physician's bills should be paid direct to him and not to the workman.

Thorough coöperation upon the part of the medical profession of the state would of necessity be required, and as such we believe that only members of component county societies, in good standing, should be appointed to operate the medical provisions of this act. Hospitals should be placed upon an equal basis. The patient should have the privilege of employing a physician of his choice, but said physician should be of sufficient proficiency and ability to do good work, and where it is proven that they are incompetent, a plan should be made to have such incompetency apply to their dismissal from competent societies or units, and that the public should be made aware of the necessity for the employment of the best surgical skill they can obtain.

There must of necessity be a uniformity of fee-bills, and where the greatest contention has been made, it has been brought by those who have a desire to frustrate such plan for uniformity.

The *Ohio Medical Journal* of December last, says:

The average medical award has floated between \$7.50 and \$8.00 and constitutes a little less than $\frac{1}{3}$ of the average award, which has been between \$25 and \$30. In 10,000 cases 99 per cent. have been adjusted without difficulty, so far as the medical aspect goes. This certainly is a record which gives the Department high hopes of a quieting trouble. The Department says we have put the medical problem into the hands of the physicians themselves, retaining always the power to control and relying on the absolute justice which resides in the heart of that great profession to render excellent service for a fair reward, and thus to participate in the glory of establishing Workmen's Compensation on an enduring and just basis.

To this comment we would add that the dollar earned, when paid by the department or by an honest insurance company, is a dollar paid and should be more gratefully received than in the

cases where long waits, intermittent payments and lost accounts give the balance in favor of so-called charity.

There are many vicious sides to the compensation acts when not properly framed or properly administered. The contract practice, at fees much less than those of profession in the locality; hospitals taking patients on the dollar per month plan; when workmen pay for their services, to clubs or medical funds, to contract for this work and the general profession be left out of consideration at time of accident; discord in the practice of medicine in localities where men are not on the square, as to their professional work, or where members of county societies or units, do not respect the rules of their organization.

When workmen properly appreciate the advantages of the assistance rendered by workmen's compensation acts, the medical aid rendered without cost to themselves, relieving them of obligations to their doctor, it should make it possible for them to pay more promptly for other services rendered to themselves and families.

Consideration must be given to the subject of prosecution for alleged malpractice, in cases coming under the compensation acts, as statistics in various states, having defense funds, show an increase in this form of prosecution.

NOTE.—The author wishes to give credit for free extracts from compilation of workmen's compensation acts, prepared under the direction of Royal Meeker, Commissioner of Labor Statistics.

APPENDIX.

EXTRACTS FROM TABLE OF "PRINCIPAL FEATURES OF LAWS RELATING TO WORKMEN'S COMPENSATION AND INSURANCE."

PREPARED UNDER THE DIRECTION OF ROYAL MEEKER, COMMISSIONER OF LABOR STATISTICS.

Twenty-three States.

SYSTEM PROVIDED FOR.	INDUSTRIES COVERED.
States.	States.
12 Compensation elective.	2 All.
3 Compulsory compensation.	3 All (except casual employees and those not exposed to hazards of employments).
3 Insurance elective.	3 All (except domestic and agricultural labor).
4 State insurance elective.	1 Especially dangerous (enumerated list) where 5 or more workmen are employed.
1 State insurance compulsory.	2 Especially dangerous (enumerated list) elective as to all others.
	1 All except railroads, etc., in interstate commerce and domestic and agricultural labor, casual employees excepted.
	4 All employing more than 5 workmen.
	1 All but railroads.
	1 Hazardous employments (extensive list), domestic and agricultural labor excluded.
	1 All employing 2 or more workmen.
	1 Hazardous (enumerated list), others if employers elect.
	1 Extra hazardous (enumerated list), elective as to all others.
	1 Dangerous (enumerated list).
	1 All employing more than two workmen.

HOW ELECTION IS MADE.

TO ACCEPT OR REJECT.

States.	BY EMPLOYER.	States.	BY EMPLOYER.
	2 Presumed in absence of notice.	1	Presumed in absence of written notice.
1	Presumed as to employers in hazardous employment in absence of written notice; other employees file notice.	4	Presumed in absence of written notice, if employer elects.
2	In absence of notice posted in establishments and filed with Industrial Commissioner.	1	Presumed in absence of written notice to employer and Industrial Commission.
1	Presumed in absence of notice posted in establishment and filed with Secretary of State.	1	Presumed in absence of written notice filed with Secretary of State.
1	Writing filed with Accident Board.	1	Presumed in absence of notice to employer and filed with Commissioner of Labor.
1	Presumed in absence of notice posted in establishment and filed with Commissioner of Labor.	1	Presumed in absence of notice to employer and filed with Insurance Commission.
1	Presumed in absence of notice posted in establishment and filed with Insurance Commissioner.	1	By accepting compensation or beginning proceedings under the act.
1	Writing filed with Commissioner of Labor.	2	Presumed in absence of written notice to employer.
1	Presumed in absence of written notice to employees.	1	Writing filed with County Clerk.
1	Writing filed with County Clerk.	1	Presumed in absence of written notice to employer if employer elects, on railroad, where acceptance must be in writing.
1	Writing filed with Commissioner of Industrial Statistics.	1	By contract in writing with employer.
1	Presumed as to employers of 4 or more persons (except railroads); no absence of notice filed with Industrial Commission; other employees may elect by filing notice.	1	Presumed in absence of written notice, if employers insure.
	By contract in writing with employee.	1	Presumed in absence of notice to employer and filed with Commission.
		1	No option.

BY EMPLOYER.**States.**

- 2 By subscribing to State Association, or insuring in other Company.
- 1 Presumed as to employment in hazardous employments in absence of waiver posted in establishment, and filed with Commissioner; other employers file acceptance.
- 1 By payment of premiums and posting notice.
- 4 No provision.

BY EMPLOYEE.**States.**

- 1 Remaining in service, with notice of employer's election.
- 4 No provision.

DEFENSE ABROGATED IF EMPLOYER DOES NOT ELECT.**States.**

- 1 Assumed risk, fellow service and contributory negligence, except as to casual employers of not less than 5 persons.
- 1 Assumed risk, fellow service and contributory negligence as to employer in designated hazardous employments.
- 6 Assumed risk and fellow service; contributory negligence, unless wilful.
- 2 Assumed risk and fellow service; contributory negligence to be measured.
- 2 Assumed risk, fellow service and contributory negligence, except in suits by domestic and farm laborers.
- 1 None (assumed risk, fellow service and contributory negligence restricted by liability provisions of statute).
- 1 None; restricted defense of assumed risks and fellow service; requires proof of contributory negligence.
- 1 Assumed risk, fellow service and contributory negligence, except for domestic and farm labor and employers of 5 or less persons.
- 1 Assumed risks; also fellow service and contributory negligence, unless wilful, if 4 or more employees.
- 1 Assumed risk, fellow service and contributory negligence, and negligence of statutory employee.
- 6 No provision.

SUITS FOR DAMAGE ARE—

- 6 Not permitted after electing compensation.
- 1 Not permitted after electing compensation, unless employer is in default on insurance premiums.
- 2 Permitted in lieu of compensation.
- 4 Permitted after elective to receive compensation.

States.

- 1 Permitted in lieu of compensation if employer was guilty of serious or wilful misconduct or violated safety law.
- 1 Permitted in lieu of compensation if employer was grossly negligent
- 1 Permitted if employer fails to secure payment of compensation; defense of fellow service, assumed risks and contributory negligence abrogated.
- 1 Permitted if injury is due to the failure of the employer to comply with safety laws.
- 2 Not permitted after employer's election, unless he is in default on premiums.
- 1 Permitted if injury was due to employer's failure to comply with safety laws, or his intention to injure, or employer is in default on insurance premiums.
- 1 Not permitted against employers accepting insurance system, except for wilful or gross negligence, causing death.
- 1 Permitted if injury was due to wilful act of employer; his failure to comply with safety law; or if he is in default on premiums.
- 1 Permitted in addition to insurance premiums, if injury resulted from deliberate intention of employer.

SPECIAL CONTRACTS.

- 2 Approved schemes may be substituted.
- 5 Employers may insure or maintain in a benefit fund, but may not refuse liability fixed by law.
- 1 Approved scheme may be substituted, but no reduction of liability allowed.
- 5 Forbidden.
- 1 No substitute agreement valid.
- 1 Permitted if compensation is provided not less than that of the act.
- 1 Law is based on contracts with casualty companies. Employer of not less than 1,000 persons may maintain establishment funds.
- 1 Employer must insure in authorized company or state association.
- 1 No waiver permitted; insurance with other companies must conform to law.
- 1 Not permitted.
- 1 Approved schemes or insurance permitted; must contribute to surplus fund of United States.
- 3 No provision.

BURDEN OF COST ON.

- 20 Employer.
- 1 Employer, not less than 50 per cent. (plus cost of management in case of establishment funds), remainder on employees.
- 1 Employees one-half of 1 per cent. (not less than 25 cents per month); employer 6 times as much; state subsidiary.
- 1 Employer 90 per cent.; employee 10 per cent.

SECURITY OF PAYMENTS.

States.

- 3 Employer must give proof of solvency or insurance risks.
- 1 Employer must give proof of financial ability; furnish security; insure or make other provision for security.
- 1 Bond may be required to secure lump sums awarded by court; insurers have rights and duties of insured employees.
- 1 Employer must give proof of financial ability or procure state mutual or private insurance.
- 1 If insolvent, claims are a first lien.
- 1 If insured employer is insolvent; claims are enforceable directly against the company.
- 1 Employer must give proof of financial ability or give bond.
- 2 Compensation payments are preferred claims on assets of employer.
- 1 Payments are a claim superior to incurred debts.
- 1 Judgments awarding compensation have same preference as wage debts.
- 1 Payments have same preference as wage debts.
- 1 Employer must give proof of financial ability (deposit of securities may be required) or procure state mutual or private insurance.
- 1 Establishment funds must be held as trust funds.
- 1 State control of employee's insurance association.
- 6 Insurance has no state control.

TO BE COMPENSATED DISABILITY MUST CONTINUE.

- 11 More than 2 weeks.
- 1 More than 6 days; then compensation from 8th day.
- 3 More than 2 weeks (payment from date of injury, if disability lasts 8 weeks or more).
- 1 More than 1 week (payment for first week if disability lasts more than 4 weeks).
- 1 At least 2 weeks, then compensation from date of accident.
- 1 Any time.
- 3 More than 1 week.
- 1 Loss of earning power shall exceed 5 per cent.
- 1 At least 1 week if so provided in the contract.

COMPENSATION FOR

Death.	Total disability.	Partial disability.	Medical and surgical aid.
\$100 funeral expenses; 50 percent. of wages for 312 weeks; \$5 min., \$10 max.; no dependents, \$750 to state expense fund.	50 per cent. of earnings for not over 520 weeks; \$5 min., \$10 max.	50 per cent. of wage decrease; \$10 max. for not over 312 weeks; fixed rates for specified injuries.	During first 30 days.

COMPENSATION FOR

Death.	Total disability.	Partial disability.	Medical and surgical aid.
4 years' earnings; \$1,500 min., \$3,500 max.; no dependents, \$150.	50 per cent. of weekly earnings for 8 years; \$5 min., \$12 max., up to \$3,500.	50 per cent. of wage decrease; \$12 max. for not more than 8 years; fixed rates for specified injuries.	During first 8 weeks not over \$200; physician or surgeon during disability, unless employee prefers his own.
Funeral expenses, not over \$100; 50 per cent. of wages for 300 weeks; \$5 min., \$10 max.	50 per cent. of wages for 400 weeks; \$5 min., \$10 max.	Fixed rates for specified injuries; proportionate for others; \$5 min., \$10 max.	During first 2 weeks, not over \$100, including burial if injury was fatal.
3 years' earnings; \$1,200 min., \$3,600 max.; no dependents, \$100.	50 per cent. of weekly earnings; \$3 min., \$15 max., for not more than 8 years.	25 to 50 per cent. of weekly earnings; \$3 min., \$12 max. for not more than 8 years.	Only if employee dies, leaving no dependents.
50 per cent. of wages for 300 weeks; \$4 min., \$10 max.; no dependents, \$200.	50 per cent. of wages for not over 500 weeks; \$4 min., \$10 max.; total not to exceed \$4,000.	50 per cent. of wage decrease; \$10 max. for not over 300 weeks; fixed rates for specified injuries.	During first three weeks.
25 to 60 per cent. of wages for 300 weeks; \$6 min., \$10 max.; no dependents, \$100.	50 per cent. of wages for 400 weeks; \$6 min., \$10 max.	50 per cent. of wage decrease for 300 weeks; \$6 min., \$10 max.; fixed rates for specified injuries.	During first 90 days, not over \$100, or by order of court, \$200.
\$100 funeral expenses; 50 per cent. of wages for 350 weeks; \$5 min., \$10 max.	50 per cent. of wages for 300 weeks; \$5 min., \$10 max., then 40 per cent. of wages during life; \$4 min., \$8 max.	50 per cent. of wage decrease; \$10 max., for 300 weeks; fixed rates for specified injuries.	During first 3 weeks, not to exceed \$20.
150 times weekly earnings, not more than \$3,000; no dependents, \$100.	50 per cent. of average weekly earnings; \$10 max. for not more than 300 weeks.	50 per cent. of wage loss; \$10 per week for not more than 300 weeks.	Only if employee dies, leaving no dependents.
35 to 60 per cent. of wages for 300 weeks; \$5 min., \$10 max.; no dependents, \$100.	50 per cent. of wages for 400 weeks; \$5 min., \$10 max.	Fixed scale for specified injuries; others proportionate.	During first 2 weeks, not over \$50.
1,200 times daily earnings; \$3,000 max.; no dependents, \$100.	50 per cent. of wages (not more than \$10 weekly) for not more than 8 years.	50 per cent. of wage decrease; same limits as for total disability.	Only if employee dies leaving no dependents.

COMPENSATION FOR

Death.	Total disability.	Partial disability.	Medical and surgical aid.
50 per cent. of weekly wages for 300 weeks; \$4 min., \$10 max.; no dependents, \$200.	50 per cent. of weekly earnings for not over 500 weeks; \$4 min., \$10 max.	50 per cent. of wage decrease, \$10 max. for not more than 300 weeks; fixed rates for specified injuries.	Reasonable services for first 2 weeks; \$200 max. in fatal cases with no dependents; including burial.
4 years' earnings, but amount added to prior disability payments may not exceed 6 years' earnings; no dependents, \$100.	65 per cent. of wages; if nurse is required 100 per cent. after 90 days; no total to exceed 6 years' earnings.	65 per cent. of wage decrease; no total to exceed 4 years' earnings; fixed rates for specified injuries.	For not more than 90 days.
2,400 times one-half the daily wages; \$4,000 max.; no dependents, medical and burial expenses.	50 per cent. of average semi-monthly earnings, during disability, not to exceed \$4,000.	50 per cent. of wage decrease until recovery, not to exceed \$4,000.	Only if employee dies, leaving no dependents.
3 years' earnings; \$1,000 min., \$5,000 max.; no dependents, \$100.	65 per cent. of wages for 240 weeks, then 40 per cent. for life.	65 per cent. of wage decrease for fixed periods, proportionate to disability.	During first 90 days.
\$100 funeral expenses; widow or widower, 30 per cent. of wages until death or remarriage; 10 per cent. additional for each child under 18 years; not over 66 $\frac{2}{3}$ per cent. total.	66 $\frac{2}{3}$ per cent. during continuance; \$5 min., \$15 max.	66 $\frac{2}{3}$ per cent. of wage decrease, fixed scale for specified injuries; \$5 min., \$15 max.; for certain maimings, \$20 max.	During first 60 days.
3 years' earnings; \$1,000 min.; no dependents, \$75 min., \$100 max.	50 per cent. average weekly wages during previous 12 months, if so long in employer's service; if not, then a weekly benefit for such shorter period as he may have been in such service.	Difference between amount for total disability and amt. workman is to earn after the injury; fixed proportion for special injuries.	Only if employee dies, leaving no dependents.
50 per cent. of wages for 400 weeks; \$4 min., \$10 max.; no dependents, \$200.	50 per cent. of wages for not over 500 weeks; \$4 min., \$10 max.; total not to exceed \$3,000.	50 per cent. wage loss, \$10 max. for not more than 300 weeks; fixed rates for special injuries.	During first 2 weeks.

COMPENSATION FOR

Death.	Total disability.	Partial disability.	Medical and surgical aid.
\$125 burial expenses and 50 per cent. earnings for 100 months; \$20 min., \$60 max.; total not to exceed \$5,000. No dependents, \$125, medical and burial expenses.	50 per cent. earnings for 100 months; \$20 min., \$60 max.; total not to exceed \$5,000.	50 per cent. wage decrease, \$40 max. for not more than 60 months; fixed rates for special injuries.	Only if employee dies, leaving no dependents.
\$100 burial expenses; widow or invalid widower, \$30 per month until death or re-marriage; \$6 additional for each child under 16; total not to exceed \$50.	\$30 per month, if single, \$35 if dependent spouse; \$6 additional for each child; total not to exceed \$50.	Proportionate benefits for not more than 2 years, if temporary; fixed rates for special injuries.	Not to exceed \$250.
60 per cent. of wages for 360 weeks; \$5 min., \$15 max.; no beneficiaries or creditors, \$100.	60 per cent. wages for not over 400 weeks; \$5 min., \$15 max.	60 per cent. wage decrease; \$15 max. for not over 300 weeks; fixed rates for special injuries.	During first week.
\$75 burial expenses; widow or invalid widower, \$20 until death or re-marriage; \$5 additional for each child under 14; total not to exceed \$35.	50 per cent. wages until death; \$3 min., \$6 max.	50 per cent. wage decrease; \$4 min., \$8 max. for 26 weeks; loss of arm, leg or eye, 156 weeks.	Not to exceed \$150.
\$150 funeral expenses; 66 $\frac{2}{3}$ per cent. wages for 6 years; \$1,500 min., \$3,750 max.	66 $\frac{2}{3}$ per cent. wages until death, if permanently disabled; \$5 min., \$12 max.	66 $\frac{2}{3}$ per cent. of wage decrease, \$12 per week max.; not over \$3,750 in all; fixed rates for special injuries.	Not to exceed \$200.
\$75 funeral expenses; widow or invalid widower receives \$20 monthly until death or re-marriage; each child under 16, \$5 per month; total not to exceed \$35.	\$20 per month if single, \$25 if married; for each child under 16 years, \$5 per month; not over \$35 in all.	Proportionate; not over \$1,500.	50 per cent. of benefits added for first 6 months of total disability; not more than 60 per cent. of wages in all.

TIME FOR NOTICE AND CLAIM.

States.

- 1 Notice in 30 days, claim in 1 year.
- 1 Notice as soon as practicable, not later than 30 days, claim in 6 months.
- 1 Notice in 15 days; if in 30 days not barred, except as to extent employer was prejudiced; bar absolute after 90 days.
- 1 Same, except 14 days, claim in 1 year.
- 1 Same, except 14 days.
- 1 Notice in 10 days, claim in 6 months.
- 1 Notice in 3 months, claim in 6 months.
- 1 Notice as soon as practicable; claim in 6 months; petitions filed in any court in one year.
- 2 Notice as soon as practicable and before leaving service; claim in 6 months.
- 1 Notice in 30 days, claim in one year.
- 1 Notice in 30 days, claim in two years.
- 1 Notice in two weeks; none required in case of death or compensation action on claim within one year.
- 1 Notice in 30 days, claim in 6 months for disability, 1 year for death.
- 1 Notice of injury in 10 days, of death in 30 days, unless excused for cause; claim in one year.
- 1 Contract may require reasonable and timely notice.
- 2 Notice as soon as practicable; claim in 6 months.
- 1 Applications must be made and claims enforced in one year.
- 2 Claim in one year.
- 1 Claim in 6 months.
- 1 To be fixed by board.

DISPUTES SETTLED BY

- 1 Compensation commissioners; appeals to courts.
- 1 Arbitration for each case, subject to review by industrial board and appeals to court.
- 1 Industrial commissioner and two others as arbitrators; limited appeal to court.
- 1 Local committee or arbitrators; court review allowed.
- 1 Industrial accident board arbitration; appeals to supreme court.
- 1 Courts.
- 1 Arbitrators or district court of county.
- 1 Proceedings in equity.
- 1 Judges of common pleas; limited appeal to supreme court.
- 1 Arbitration of courts.
- 1 Courts in summary proceedings.
- 1 Industrial commission; appeal to courts.

States.

- I** **Arbitration; reference to attorney general; appeal to courts.**
- 4** **Industrial accident commission; limited appeals to courts.**
- I** **Workmen's compensation commission; limited appeals to courts.**
- I** **Arbitration, if so provided in contract.**
- I** **Arbitrators for each case; industrial accident board; appeals to courts
on points of law.**
- I** **Industrial commission.**
- I** **Public service commission; limited appeals to court.**
- I** **Industrial insurance department; appeals to court.**

XXII.

DISCUSSION.

Dr. Thomas Wray Grayson, Pittsburgh:

In listening to the papers read today I have been struck with something that has occurred to me in other meetings of the Academy of Medicine—the many ways in which different speakers can look at a subject. Points have been brought out that I had never thought of in looking over the program.

Dr. Price refers to the inspection of our manufacturing establishments as being inadequate. My acquaintance with that subject is not extensive, but I can say that in Pennsylvania, altho we have very good laws governing factory inspection, such inspection is very inadequate. I know a number of instances in which injuries were received and the safeguards were *afterward* put in by the employers without requirement by the factory inspector.

Dr. Tuckerman speaks of industrial insurance and of the advantage of having the Academy take up this subject. I know of no body in this country that could handle the matter better than this Academy.

Dr. Estes has spoken of the 8-, 10- or 12-hour day in the mills. In Pittsburgh, the 8- or 10-hour day is quite a live subject. It is true that in the 8-hour day much more has been accomplished than in the 12. One of the reasons assigned for this is better organization of the work and improvement of machinery. That brings us to a very vital problem, the question of speeding up and the bonus system. Those of you who have read the Pittsburgh Survey will remember that Mr. Fitch has a chapter in which he speaks of this system in a derogatory way. He believes it one of the worst features in the steel industry. This is not the case except in a limited way. He gives one side of the question. From the employer's standpoint it looks entirely different. There is a minimum amount of work required which can easily be done. Beyond this amount the men are given a bonus. Of course this system is applied to many industries. For instance the system works out in the Westinghouse plant and I cannot see the evils of it.

You would naturally expect one from Pittsburgh to speak more particularly of the things for which Pennsylvania is noted—coal mining, railroading, iron and steel and *smoke*.

Regarding the railroads: Allegheny County is one of the largest railroad centers in the country and railroads touch on our subject in two ways: (1) Accident, and (2) the production of smoke. These will be mentioned later.

Coal mining: We have here the accidents incident to coal mining. Considering these in connection with the large foreign population in the coal mines, I cannot forbear saying that when the head of a family is killed in the coal mine, it seems a poor compensation for his family to be given a few hundred dollars and allowed to take care of itself or sent back to Europe. It is considered a fine thing when the coal company pays a paltry few hundred dollars.

Regarding the gas in coal mines, there is a prevalent idea that it is a remedy for whooping cough. One mine owner I heard of placed two of his children on a car which he sent into a coal mine for this purpose and it is said that the children had no more whooping cough.

In the iron industry much of the ore now used comes from the Lake Superior district and looks like a heavy brown powder. When that is handled and put into furnaces immense clouds of the dust are scattered over the neighborhood. This ore dust is a great menace to the whole community, particularly that part around the mills. It kills vegetation, causes windows to be kept closed and is breathed in much as smoke. In the steel mills also we have steel dust floating around, irritating the eyes and the respiratory tract.

Did you ever think of the noise of the steel mill, the terrible roar of machinery, the hissing of steam, the clanging of the doors and the shouts of the men? These things are very hard on the workmen, causing deafness and nerve strain. The heat in summer is intolerable. The men wear as little clothing as possible, but perspire profusely and drink enormous quantities of water. A common acute illness in the mills is cramps said to be due to the excessiv loss of fluid from the body by perspiration. In the winter time, too, these men perspire freely. Facilities are not provided for change of their clothing. A man, in a dripping perspiration, goes out into a temperature below zero and it is no wonder that pneumonias are so prevalent among steel workers. Sir Thomas Oliver of Great Britain gives the percentage of deaths from pneumonia as 37 among steel workers which is far above the average.

A steel mill is never idle. The men are changed in day and night shifts and this is particularly hard on the nervous systems of the men. Imagine a man who has been changed to the night shift, trying to rest during the day in a frame house in a noisy neighborhood with the August sun beating on the house. Sleep, if possible, would not be very refreshing. It is no wonder men say they do with less sleep when working at night than by day.

The smoke is a by-product—a curse of which we are just beginning to realize the awfulness. There was a time when we were positively happy in this condition in Pittsburgh, feeling that it showed our prosperity, but that time is past. We were then "corrupt and contented" as Lincoln Steffens said. Now we are awaking to the knowledge of the condition and taking some radical steps to lessen the trouble. The smoke causes damage by reason of the particles of carbon or soot floating in the atmosphere. One of our department stores in Pittsburgh has estimated that the dirt causes a loss of \$50,000 in one year by damage to the goods. Vegetation requires more care in Pittsburgh. There is a similarly bad effect upon the human being. Did you ever think how much it means to have the smoke obscure the day-light? Dr. Jackson spoke of the drawbacks of artificial lighting. When the atmosphere is laden with smoke it means that the natural sunlight is dim and on a dark day in the city we must have artificial light everywhere. So on many hours of the day or often all day long we have artificial light in the mills and offices. No

lighting engineer has found a way of making artificial light as satisfactory to the eyes as pure sunlight. When the air is laden with smoke the windows of our homes are kept closed and ventilation is interfered with. The smoke problem is one of greatest importance.

Dr. Helen C. Putnam, Providence:

In the paper on "Home Surroundings" the new equipment for instruction in "Domestic Science" in elementary schools at Pittsburgh was criticised as too unlike what pupils have to work with in their homes. In numerous cities in other countries and in some of our own, school boards secure a regular cottage or flat, or small city house. Here the pupils keep house with instructors to show them how. Some even have nurseries, the babies being brought in for a few hours care by neighbors, as in a day nursery. Others, more wise, use manikins or large dolls.

A few recent reports of medical studies of children between the first year of infancy and school age are showing the imperative need of regular medical inspection of all children at these years, to check ailments in their incipency and to lessen very greatly, or at least modify medical inspection of schools.

Dr. Forsyth, in the Medical Inspection Center of the City of Westminster in London, examined 374 "well children," including 131 babies, *i. e.*, under one year. Among those one year old 2.6 per cent had defective teeth; among those two years old, seven times as many (18.1); among three year olds, thirteen times as many (34); among four year olds, twenty-four times as many (63.6). In our elementary schools we are finding fifty to ninety per cent. have carious teeth as reported by various inspectors. The older the children, the more extended the associated systemic or local damage.

Tonsils were found normal in these babies; but in the second year over seven in a hundred were found enlarged (7.8); in the third year, twice as many (16.9); in the fourth year, three times as many (24); in the fifth year, 26.9 per cent. In our elementary schools from thirty to forty per cent. are reported.

Adenoids were found in 1.5 per cent. of the babies; in seven times as many children in their second year (10.4); in fifteen times as many in their third year (22.9); in twenty-five times as many in their fourth year (38); in the fifth year in 33.3 per cent. In our elementary schools there are more adenoids reported than enlarged tonsils.

Dr. Forsyth also reports on other details, such as rickets, etc. These were not exceptionally poor or misused children in any way, and the lessons from the report are as definite for us as for England. We should gradually enlarge the scope of our "Mothers' Consultations" or "Baby Clinics" to include all children under school age. These conferences, as you know, are for "well" children, to instruct mothers in keeping them well; when any ailment is found the children are sent elsewhere for treatment. The growth of vocational schools and classes in homemaking for girls over 15 years, including even married women, will secure better care of young children.

Dr. Henry O. Marcy, Boston:

I should like to ask Dr. Grayson whether they have had any success in the control of the smoke in Pittsburgh.

Dr. Grayson:

I may say yes. The only practical work has been done thru the factory inspectors appointed by the city. They have gone with the manufacturers and shown them the actual saving by the use of the smoke-saving devices, and that they can use fuel more economically with them. There are plenty of these devices and they are good. A stoker has to be made to use them before he will admit their advantage.

Dr. Marcy:

Sometime ago I heard this subject discuss in Boston. The illustration was given of two furnaces just alike: upon one the draft was up; on the other it was down. In one year there was a saving of \$750 with the furnace in which the draft was down.

Dr. Thomas Darlington, New York:

Just a word regarding the smoke. We have no smoke in Manhattan. The only way to stop the smoke is a matter of arrest. I had the privilege of arresting 348 persons—some of them my best friends—in one year.

So far as the Compensation Act is concerned, I would not care to discuss that. The State of New York gives the Commissioner the right to fix the physician's fees. It rests with the physician whether he will get along with the Commissioner or not. Reasonable fees are allowed in all cases.

I was interested in what Dr. Woods Hutchinson said about happiness. It is of interest that during the Hudson-Fulton celebration the record of suicides fell to one-half. Dr. Steiner tells the story of a man who had made sufficient in Pittsburgh to go home and buy a place in one of their own valleys. He had a nice home but did not enjoy it. Askt why he wanted to go back to Pittsburgh he said: "When I go there, big boss come along and say, 'Hello Mike.'" And that was happiness to Mike. That was sufficient to leave Europe and come to this country. Speaking of these plazas and squares where the people meet, there is a place in New York where 300,000 Italians live and in it a square where the band plays and they wander round and round. They are contented because they have that square to wander around and get acquainted.

Regarding cramps in the steel mills, they are not due to loss of body fluids, but due entirely to the temperature of the water, the icing of water affecting some branch of the pneumogastric nerve. A circulating supply of water has been put in at Homestead and since then not a single case of cramps has occurred. In one of the largest mills in Pittsburgh the cost of supplying the water was \$22,500 a year. By the installation of the circulating supply

of water there was a lessening of cost of \$20,000 a year, so that in a few years there will be a return of the cost (\$145,000). So it pays financially.

Regarding the question of pneumonia in these workmen. Away back in 1886 we had an enormous amount of lobar pneumonia. The cases came from places in which there was no dust or smoke. It was simply a question of contagion and lack of resistance on the part of the worker. In the cement mills it is another proposition. Ordinarily the cause lies in overcrowding, bad food and alcohol that give these cases of pneumonia. The cases are due to the pneumococcus rather than to the smoke. There is a list of subjects which those who are in the steel industry and the coal mining take up, and some are looked after better here than anywhere else.

Dr. Woods Hutchinson, New York:

Is it not true that those devices do save fuel and pay the manufacturers in the long run?

Dr. Darlington:

Yes it saves him money in the proper burning of the fuel, but saves him more in the contentment of the neighborhood.

Dr. Thomas D. Davis, Pittsburgh:

There is a fact that I want to mention here: When the ostrich gets scared it hides its head in the sand and thinks no one sees it. This is about true in regard to smoke consumption. While you cannot see the smoke in New York, the by-products are there and may be worse than the smoke you can see. Right in our own city we have this exemplified. I can take you to districts in which you cannot see a particle of smoke and yet every bit of the vegetation is killed. Anyone who has used anthracite coal knows something of the gases, and that they are more deleterious than the carbon from bituminous coal. The mere fact that you cannot see the dust in the air is no evidence that it does no harm. The dust from smelting iron ore is almost invisible. Yet it will collect on roofs and porches half a mile away, as a blighting red dust. It does not follow that when you get rid of the carbon you get rid of all the deleterious properties from furnaces.

Regarding the steel workers and their use of ice-water, they use almost universally oatmeal water; ice-water is not supplied to the men; if they have ice-water they get it on their own account. Time and again have I seen the men throw a pail of water over their hot bodies and go back to the heat. Altho this is forbidden, they will do it just as they do other careless things.

Dr. Edward Jackson, Denver:

That gases may be more deleterious than dust is probable, but we must recognize that dust also may be dangerous. The most striking instance of this is in the dust of the quartz especially, particularly in Utah. Dr. Betts, in working up statistics of a certain mill, found that the average length of

time workmen could labor there was 14 months and that in four and one-half years among the employees, numbering 40 to 60 young healthy men, there had been 166 deaths from chronic interstitial pneumonia induced by stone dust. In these mills there were no fumes and no gases. But there was an extremely sharp, angular, very fine dust. The only thing that has made it possible for men to continue that work has been the removal of that dust from the atmosphere they breathe.

Dr. Darlington:

If you get plenty of heat you burn up the hydrocarbons and carbon monoxid. It is not the product of the carbon that you save; it is the product of the carbon monoxid in all low combustion. Where they use cylinders they have the low form of combustion. These are used in apartment houses where they do not want much steam. You have the carbon monoxid come out of the chimney and have a great deal of hydrocarbons. The sulphuretted hydrogen which people can smell they think much more detrimental.

So far as the icing of water in mills is concerned, the ice is not furnished by the employer but I have seen the men buy it themselves.

Dr. Davis:

I know that ice used in the mills is used contrary to the rules. Those who use it are not usually the steel workers, but engineers and others who are not exposed to so great heat. Coal is not used in the production of steel at all; steel is made absolutely by the use of the natural gas or by coal turned into gas. The deleterious vapors coming from steel mills are not connected above with the coal. The fumes from smelters of zinc, copper, vanadium, etc., around our city injure vegetation more than smoke, yet these fumes are almost invisible.

Dr. James H. McBride, Pasadena:

We had an interesting instance of the suppression of a dust nuisance in Southern California.

The owners of a cement manufactory were sued by orange growers for damage done to their trees by dust. The court has ordered them to buy the orange groves at a cost of \$116,000 and has also required them to suppress the dust. This has been done principally by passing it thru water sprayed into a large room. The dust nuisance at these works has been practically abated.

Dr. H. M. Hurd, former Superintendent of Johns Hopkins Hospital, told me they had gotten rid of the smoke from their boiler fires by using smoke consumers. They put a smoke consumer in each of their fire boilers at a cost of \$500 apiece and the first year the saving of fuel amounted to about \$2,000.

The twelve-hour day for workmen has been demonstrated to be injurious to the worker and unprofitable for the employer. At the Engis Chemical Works in Belgium, where each man's product could be measured or weighed,

it has been shown that the men can do as much work in eight hours as they formerly did in 12. The Company shortened the hours and required the workmen to take a bath after the day's work and change their clothing. The result has been that from being an irregular and unreliable class of workers they now remain in the employ of the Company. Drunkenness and discontent have ceased and the Superintendent says: "In the eight-hour day, representing seven and one-half hours of actual work, the same workmen at the same ovens with the same implements and raw materials, produced as much as previously in twelve hours."

The Zeiss Optical works at Jena reduced the hours of work from twelve and ten to eight. There has been less sickness, less falling out of men seeking change, and a greater average output per man. All this has been accomplished without "speeding up" and has resulted in a healthier and more contented class of workers.

Mr. John Roach, Trenton, N. J.:

Regarding the dust in the mills of California—did they protect the workers in the mills as well?

Dr. McBride:

I think they did not because of the attitude of the court.

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